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*SINCE 1825*

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## CONTENTS



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THE AMERICAN
JOURNAL OF PHARMACY

VOL. 99 DECEMBER, 1927 NO. 12

# EDITORIAL

## THE COSMETIC URGE

THE PRESIDENT of a large cosmetic concern uses a generous advertising space in the *United States Daily* to broadcast among "discriminating readers" the following information:

> "COSMETIC LEGISLATION is almost as long overdue as was food and drug legislation when it arrived in 1906. Quite as many extravagant and outlandish claims are made for cosmetics today as formerly were advanced for fake foods and patent medicine.
>
> "This is to announce in advance of bills to be introduced in next Congress, that we appreciate the need for sane regulatory national cosmetic legislation. First, because it is right; and second, to give the forty-eight states a correct model to follow, rather than to have 57 varieties of 'half-baked' state statutes."

A gentleman from Pittsburgh may think it unwise to have "companionated" the "57 varieties" and the "half baked." But that is not our story.

We reprint his message because it represents an attitude that we judge to be quite sensible—and because it is contrary to the attitude of a great number of individuals and organizations who have recently rushed into print and elsewhere to combat the proposed legislation.

So does history repeat itself—for even in the days when babies were swindled to sleep with laudanum lullabies—and when consumers of angel cake died of painter's colic from the chromate of lead used to give the egg impression—even in those hazardous days—there were interests that viciously fought the proposed food and drugs act.

Then, too, when the narcotic legislation was evolving, opponents were numerous and vociferous.

Today no one denies the great good accomplished by these prohibitory laws.

(We omit reference to another "prohibitory" law because there is such a difference of opinion in regard to its manner of enforcement—though its purpose is generally conceded to be quite worthy.)

In those drab days when milady dressed in spacious clothes and left her face as she found it, the cosmetic urge was a repressed complex.

But other days have come. In painting, in sculpture and elsewhere the artistry of the natural is neglected awhile and the colorful impressionistic, cubist, futuristic, holocaustic style is rampant.

Milady's habiliments and make-up have reacted keenly in the same direction. Never in the history of earth has the cosmetic urge had freer rein.

And never in the history of cosmetics has there been such an opportunity for conscienceless manufacturers to develop and dispense products that are unsafe and unworthy.

Aniline hair dyes—mercurials and arsenicals—and other toxic chemicals are used with no discrimination.

Certainly there is need of "sane, regulatory cosmetic legislation."

Of course—there are those who will oppose it because the American Medical Association is said to sponsor it.

Somehow or another that body, in spite of its past great achievements in securing certain "sane, regulatory legislation," is not particularly popular in a great many quarters. Its motives are always questioned—and its methods, too, are criticized.

There may be warrant for such opinions, but from the standpoint of its accomplishments—in many directions—we cannot help but admire the smoothness and the decisiveness with which that great organization functions.

In its *good* work, more power to it! And a "sane" regulation of the cosmetic business *is* good work.

IVOR GRIFFITH.

## CALENDAR REFORM

AN AMERICAN captain of industry, whose products are familiar in all parts of the civilized world, has lately taken up the cudgels for a trenchant reform in the calendar. As he is a liberal advertiser, his communications have received courteous attention in quarters in which otherwise little consideration might have been given. The main feature of his plan is to divide the year into thirteen periods of twenty-eight days each, giving an extra day each regular year and two in leap years. Humorists have not failed to note that this plan will make one more pay day each year. It would bring the several holidays on the same day of the week each year, which is considered by some to be an advantage, but will probably not be widely popular.

The origins of the calendars of primitive nations is not known to us, but they rest on the relation of the earth to the sun as far as the major unit goes, and upon the moon's motion for duodecimal subdivision. Unfortunately, the solar and lunar periods bear no simple inter-relation, and hence much confusion has arisen in the past. The first and greatest "kaiser" made a drastic change in the calendar, but did not get sufficient exactness to eliminate confusion entirely. He bestrode the world like a colossus and his arrangement was adopted throughout the civilized world of his day. Centuries elapsed under the Julian calendar, and dates and seasons were getting steadily out of coincidence. The Gregorian system, promulgated in the latter part of the sixteenth century, found immediate acceptance throughout a large part of the Christian world, but the Protestant nations hesitated. They came in, however, though in some cases tardily. Great Britain was among the last. In 1752, by act of Parliament, very carefully drawn some years before, the day after the 2d of September was made the 14th, eleven days being cancelled. It is said that a mob of the lower classes appeared in the streets of London crying, "Give us back our eleven days." It is perhaps fortunate for the United States that the change was made while the American colonies were obedient to the mother country, or some resistance might have been shown to the adoption of a system sponsored by perfidious Albion.

Since the reform by Gregory, no disturbance of the calendar has found application except that established in France in the Revolution. This was somewhat romantic. It was due, indeed, largely to a French

poet. Twelve months of thirty days were provided, each with a fantastic name. The odd five days were officially entitled "complementary days," but popularly known as *"sans culottides,"* days without trousers." This calendar is said to be still in use by a very radical paper in Paris, but it is a regular custom of French officials to use it when referring to legal enactments made during its vogue. Thus an event occurring on the 27th of July, 1794, would be cited as of the 9th Thermidor.

Mr. Eastman's plan would cause the same day of a given month to fall on the same day of the week in each year. He probably considers that an advantage as many others do, but the vast mass of people will be against it. The shifting holiday is popular. It occasionally produces some confusion as when Christmas or Independence Day falls in the middle of the week, but it is convenient when they fall on Saturday, Sunday or Monday, as longer periods for outings are afforded and in these days of the automobile such opportunities are acceptable to a great many persons.

There seems to be no possibility of any satisfactory simplification of the present calendar. The world has no longer a dominating personality. There is some hope that church authorities may see a way to make the Easter period a definite one. It is now the only movable feast of the churches of western Europe and America. It seems that no violence will be done to the religious principles involved in the fast and feast of the spring period by assigning a fixed date.

The difficulties to be met in a radical change of the calendar are suggested by the difficulties which have been met in the introduction of time-zones. It was many years ago that some adjustment was suggested, growing out, in the main, of the completion of the transcontinental railroads with their long distance express trains. An important point in time has been the basic meridian. Americans were not unfavorable to Greenwich, but France wanted Paris and other nations had also preferences for locations at which an important observatory was established. These differences were eliminated and Greenwich time has a wide vogue. Curious objections were made to the zoning system. The Mayor of a New England town called the system a sin as interfering with "God's time." A similar objection was made by a correspondent to a Philadelphia newspaper when the daylight-saving system was put in operation.

It took years of conferences of scientific organizations among themselves and with official bureaus before the simple and convenient

zoning system now in operation in the western hemisphere was established. Astronomers have gone a little further, having established the time of the Greenwich meridian as a zero for their clocks and made the day contain twenty-four hours of sixty minutes each. Some nations of western Europe have now the twenty-four-hour day in public use, especially in railroad schedules.

Time, it seems, according to the doctrine of relativity, is the fourth dimension, but only the *illuminati* among the physicists can grasp such classification.

*Henry Leffmann.*

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# ORIGINAL ARTICLES

## A SAINT AMONG THE DRUGS

**By Fred B. Kilmer, Ph.M., and Josephine I. Dooley**

LEGEND, story, song, fable and history rise with the mists, mingle with the sky and sunshine, and are echoed back from the ruins on the vineclad banks of the river Rhine.

In the picturesque valley, where the river Nahe joins the Rhine, lies a sleepy Hessian town, the poet's Bingen. Here, in this region, during the Middle Ages, lived the Benedictine Abbess, Hildegarde—scientist, dreamer, healer; physician, pharmacist and saint.

Hildegarde's personality is seen in her own records, and in contemporary writings. She was born in 1098, of noble family, in Brocktheim Castle, whose ruins still stand high above the Rhine, at Kuesnach. At the age of eight she was taken to the convent at Disibodenberg, to be reared by the pious Dame Yutta. At thirty she became the head of this monastery. A few years later, having gathered about her a group of women of noble birth, she founded the monastery at Rupertsberg, the scene of her long life, and where she was laid at rest at the age of eighty-one.

How did she look? We have no portrait of her other than the drawing of the monks, where she is shown in the somber garb of a nun, receiving the "Light from Heaven."

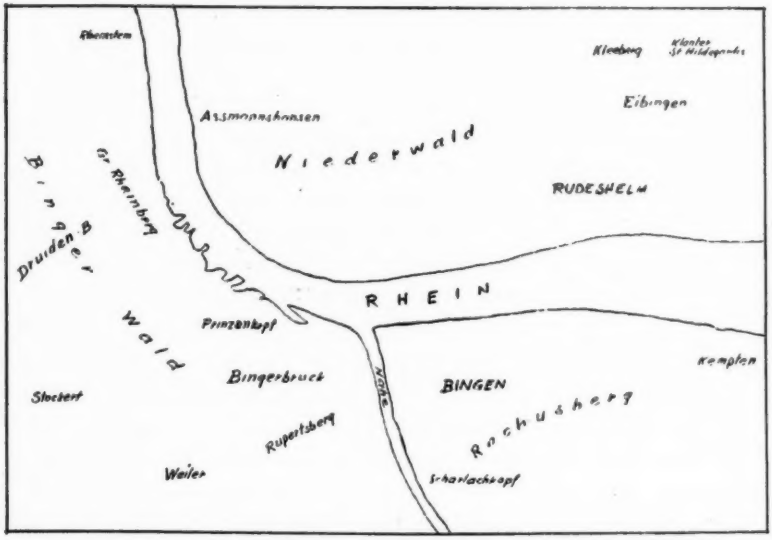
From a spare, sickly child she grew into a tall woman, stately in mein, haughty in demeanor, with a kindly, piercing eye, a heart filled with love for the church and for humanity, but more than all, bear-

ing the burden of a mysterious revelation from on High.

The nuns of the Middle Ages at times wore the black and ugly garb of the Order, but the monastic dress was not compulsory. Abbesses and nuns of noble birth wore gorgeous raiment for occasions of State. In vain did bishops and archbishops cry out against gay garters, colored hose, golden hairpins and silver belts, jewelled cloth and costly furs. Admiring pilgrims poured them into the monasteries, and, on occasions, the women donned them.

So one may picture Hildegarde, the woman and saint, clothed as was the Abbess of Chaucer:

> "Ful fetes was hir cloke, as I was war,
> Of smal coral about hir arm she bar
> A piere of bedes, gauded al with grene,
> And theron hung a brooche of gold ful shene."




**Map of Rhine Region near Bingen—The Scene of Hildegarde's Life and Labor**

A community complete within itself was the Monastery of Hildegarde at Rupertsberg. Lands, farms, vineyards, gardens, mills, hospitals, library, workshops—a trading center for the Valley of the Nahe; a resting place for crusaders and travelers journeying to and from the Persias and the Holy Land, or the Islands of the Mediterranean.

With other monasteries, that of Rupertsberg, carried on all the activities of life, including care of the poor and the sick. Here was the center of commerce, of learning in the arts, literature, law, medicine and religion.

As Abbess, Hildegarde had the duties and powers of a baron, ruling over lands and estates, over monks, nuns, peasants and people. She attended synods, attested decrees, counseled rulers. A medieval example of feminine supremacy in a community prosperous and eminent.

**Hildegarde Receives Light from Heaven (from Manuscript in Wiesbaden Library—Original in Gold and Color)**

Hildegarde and her nuns practiced music, chanted in choirs, studied, performed the duties of cooking, cleaning, weaving and spinning; tilled the drug gardens, made up the medicines, and tended the sick in the hospice.

Seven hours a day, nuns and monks labored with their hands; seven monastic offices were recited and sung, beginning with night office in the cold, dark church choir at two in the morning, and ending with the evening complin. "Two hours or more must be given over to 'sober and Godly recreation.'"

Through the day, and far into the night, nuns and monks translated, copied manuscripts and wrote commentaries in fair, round script, ornamented the initial letters and illumined the sheets.

Up and down the Rhine, across the Valley of the Nahe, Hildegarde taught, preached and healed. With her own hands she washed and dressed the sick, made their beds, gave them food and medicine. She shrank from no disease, not even leprosy.

Saints like Hildegarde did not live in solitude and sanctity. She was an outstanding womanly figure, ever striving against "dirt, disease and the devil."

During her life there were malicious whispers. "How is it that so many secret things are revealed to this silly and untaught woman, when there are plenty of wise and zealous men?" There were mutterings as to "whether these revelations be of God, or mayhap seductions of the evil shades." She was falsely accused of magic, and her predictions were ascribed to divination and astrology.

In the gossip of the time, and in the records of the Medieval Bishops to the Monasteries, we can read the shortcomings of an abbess. We know that against Hildegarde it was charged that she "gadded about," went on journeys to towns and cities, to the castles of the nobles; she visited the bishops, the rulers, the politicians of the day; she went on tours of preaching, teaching, expounding, prophesying. Perhaps her accusers thought that she journeyed too often, traveled too far, lived too sumptuously. She entertained visitors at the convent—the wordly aristocrat, the secular ones of the earth, popes, knights, lords and saints. By peasant, monk, nun, priest and king, she was revered as "My Lady Prioress."

So, for Hildegarde, even while she lived, there was laudation and insinuation, homage and censure, benediction and denunciation.

Hildegarde was never certified as a saint by the Vatican, and she did not need to be. In her century, saints were made by popular choice. The people whom she cured and served while she lived, lifted her into the fellowship of the saints. She is enrolled in the Martyrologium Romanum, with September 17th, as St. Hildegarde's Day.

## The Writings of Hildegarde

Without training in the classics, Hildegarde wrote at least seven works in Latin. In those devoted to medicine, vernacular terms appear as the names of common herbs and of diseases.

She writes that in 1141, when she was forty-two years and seven months of age, a voice from Heaven bade her to commit her visions to writing. With a most unusual trait for a woman, in each work she informs the reader of her exact age at the time of the writing of the book, and she continued this record of her age even after she had passed three score and ten.

In her own time, and in later centuries, Hildegarde was known as one who "scrutinized the depths and learned to know marvels unheard of by others" as "learned among the saints, most saintly, worthy of eternal memory."

Admirers and detractors alike agree that Hildegarde had an extraordinary mind, and possessed marvelous energy and power. Her literary works are filled with passages of great power and beauty. From ten to a dozen works are credited to her authorship, besides a collection of musical compositions, a mystery play, and a history of St. Rupert. Plants, drugs, medicines and cures appear here and there in many of her writings. Two books are primarily devoted to medicine. Only a few of her books have been printed. Manuscripts and copies of her correspondence are in the museums of Europe.

In the Scriptorium, a room set apart in the ancient monasteries, her writings were transcribed. Volumes, as accurately and beautifully written as though engraved on steel, come down to us.

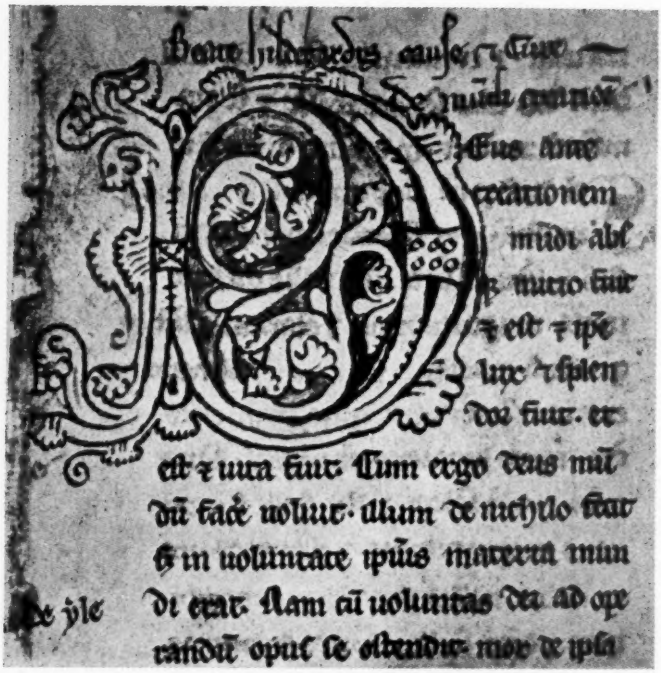
Charles Reade, in "The Cloister and the Hearth," says of the ornamentation and illumination found in these manuscripts:

> "A scroll looks barren unless a border of fruit and leaves and rich arabesques surround good words and charm the senses as those do the soul and understanding, to say nothing of the pictures of holy men and women, with which the several chapters would be adorned, and not alone is the eye soothed with brave and sweetly blended colors, but the heart lifted by the effigies of the saints in glory."

The parchment scripts of Hildegarde, even as we now see them, faded and yellow through the centuries, inspire reverence and awe. Eight centuries ago this "Sibyl of the Rhine" received these visions from the clouds; patient monks and nuns put them into words. Entrancing and beautiful are the illustrations inspired by her vivid mind, especially the miniatures of the "visions," wrought in tints and colors and illumined in silver and gold.

Pictured as moving through her visions are the force of the winds, and a glittering light. "From my infancy," she says, "up to

the present time, I being now more than seventy years of age, I have seen this light in my spirit, and not with my external eyes. Sometimes I behold within this light another light, which I name the 'Living Light Itself.' According to the Will of God, my spirit soars upward in vision to the highest Heaven, and thence I behold the changing clouds and the mutations of all created things."



**Portion of Page from Hildegarde's Manuscript Casuae et Cura (in Copenhagen Library)**

Perhaps it was given to the soul of Hildegarde, in these visions, to foresee the wonderful interplay of our still mysterious radiant energy.

Medicine and cures run through the books of Hildegarde. To the pharmacist, her Physica stands pre-eminent. This manuscript (now in the National Library of Paris), is a pharmaceutical shrine. It consists of four books, with 383 chapters.

The manuscript was put in print in 1533, and again in 1544. An analysis by Reuss gives the subjects as the elements, the trees, the

plants, the stones, the birds, the animals, the fishes, the reptiles, the metals, as being substances with curative power. Other writings likewise discuss anatomy, physiology, elements, humors, diseases and their cures.

Hildegarde's book on "Medicinal Simples" was undoubtedly popular, as a large number of manuscript copies were circulated. While she speaks of a few ancient medicinal authorities, she does not name nor quote from them. In no particular does she follow the great Dioscorides. Her knowledge of drugs evidently came through her "visions," from her personal observations made in the cultivation of drug plants, their administration to the sick, and from knowledge gained in her journeys.

She enumerates a marvelous number of medicinal substances. Her "Physica" was written in Latin; the names of drugs and other expressions, however, appear in Old and Middle German. It was evidently intended as a medicinal handbook. Tschirch gives the title "Physica" as equivalent of Pharmacy. German and other authorities mark "Physica" as "the beginning of German plant and animal science," ranking with the work of Albert the Great (Albert Magnus), the Aristotle of a century later.

Migne, a chronicler of Hildegarde, says, "All who wish to write the history of the medical and natural sciences, must read the works of St. Hildegarde. It is certain that she knew many things that were unknown to the physicians of her time."

## Saintly Medicine

Hildegarde was both a saint and a scientist. She read the Psalter and said the Offices daily. Her writings show a devotion to the Eucharist, the Virgin Mary, and the Wood of the Holy Cross. She said that she advanced more in knowledge by prayer than by study and labor.

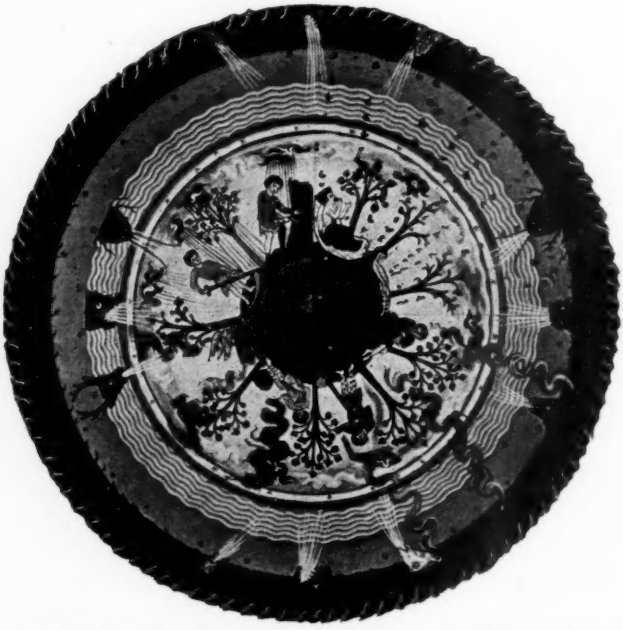
She lived an intensive, religious life. With this she combined mysticism and natural science, exhibiting an active, speculative thought. While her science and philosophy do not always agree with the dogma of the Church, she firmly declared faith in "that which the Holy Mother Church teaches and believes."

"Sin is an obstacle to the gaining of Wisdom. The great truths of science come from God; man, of his own efforts, cannot attain to them." Hence, the science of Hildegarde came through revelation.

"To Adam's fall is due the spots on the sun, the ferocity of animals, the existence of insects, plagues, venomous animals to poison, and diseases to injure, mankind.

"The marvels of human science strengthen our faith in Divine miracles. Divine wisdom (Theology) is the end that all human thought should serve; morality is the supreme science."

Hildegarde's science, as revealed in her "Visions," is written in figurative, mystical form, colored and subordinated to a religious point of view.



**Influence of Heavenly Bodies on Men, Animals and Plants (from Hildegarde Manuscript in Municipal Library at Lucca; Original in Colors)**

Scientists, artists and craftsmen of the Middle Ages had a healthy interest in nature. They looked with reverence upon every blade of grass, as the creation of the Almighty. We see this in the foliage and vegetation carved into their ruined cathedrals.

Hildegarde's nature pictures are sketches of animated nature—plants, flowers, insects, birds, animals, all united and controlled by the moving, living spirits of God's universe.

In her vision of the universe she saw the earth as a sphere or globe, around which were arranged a series of concentric shells or

zones—the atmosphere, the ethers, water and flames. The winds, or forces blown by supernatural beings, move through the zones controlling the movements of the heavenly bodies. The superior elements—water, air, earth and fire, enter into and make up the structure of the universe.

"The web of life," in the visions of Hildegarde, outran Darwin. She fused physical events, moral truths and spiritual experiences with the picturesqueness of a Dante. Nature and man, the moral world and the material universe, the spheres, the winds, the heavens, birth and death, the soul, the life to come, the Nature of God, disease, curative virtues of drugs, methods and things, were interdependent and closely interfused and interwoven.

Hildegarde approaches the doctrine of the unity of Nature when she avers that "everything in Nature is full of marvelous virtues; all things in Nature are subject to the action of heat and cold, to the influence of the starry universe, or to love and enmity between things. The movements of the heavens are the cause of all natural motions, and of generation and of corruption. Every plant on earth has its controlling star.

"There exists in Nature many strange phenomena and inexplicable forces. We would not believe that the magnet attracts iron if we had not seen it! There is a stone which no furnace can consume (asbestos), and a fish that paralyzes the hand of the person catching it. These strange properties act in some subtle and mighty fashion, which is not perceptible to our senses, and cannot be accounted for by reasoning."

"The angels have power over Nature, man, and all things of the universe, even over all diseases and wounds of men.

"Angels are set over the years and seasons, rivers and seas, the fruits of the earth, and even an angel over every herb.

"Angels have revealed to man (and especially to Hildegarde), a knowledge of science, arts, the power of herbs, likewise the pharmacy thereof.

"The science of health is from God, through His angels; from thence comes the knowledge of the virtues of herbs, and by this the properties of juices are determined.

"The common earth is not the element earth. No one ever touched the pure element water, or saw the elements air or fire. Every particular object contains all the four elements and we deal only with compounds."

Since the days of Hildegarde we have resolved the four elements into eighty, in turn each element is broken into electrons, and we have not reached the end.

"Nothing in this world of sense perishes utterly. If dissolved from one union, it does not perish, but is joined to some other group." This is the medieval way of expressing the doctrine of the indestructibility of matter.

The need for, and the anticipation of, the yet to come discovery of the microscope and the telescope, seem to be embraced in the statement, "the senses are reliable neither in respect to the greater or smaller objects."

Hildegarde barely missed anticipating Harvey's discovery of the circulation of the blood, when she wrote, "Just as the blood moves in the veins, causing them to vibrate and pulsate, so the stars move in the firmament and send out sparks, as it were, of light, like the vibrations of the veins."

Not unlike the teachings of the modern eugenist, are Hildegarde's views of the influence of the moon on generations. "The moon is the mother of all seasons. Some days of the moon are good, others bad; some useful, others useless; some strong, others weak." She marvels that the while men have sense enough not to sow crops in mid-summer, or in the coldest days of the winter, they persist in begetting offspring at any time, according to their own pleasure, without regard either to the proper period of their own lives or to the time of the moon. The consequence of their heedlessness is the birth of defective children.

Dramatically portrayed in words, beautifully illuminated in the manuscripts, is Hildegarde's concept of life, portrayed in human form: "The countenance thereof was of such beauty and brightness that it had been easier to gaze upon the sun."

The image speaks: "I am that supreme and fiery force that sends forth all the sparks of life. I am that living and fiery essence of the divine substance that glows in the beauty of the fields. I sustain the breath of all living. All things live because I am in them and am of their life. I am the force that lies hid in the winds and in the elements, from me they take their source, and as a man may move because he breathes, so doth a fire burn but by my blast. Mine is the blast!"

"Before all things and above all things, care must be taken of the sick," was the Benedictine rule.

While the members of this order attained a high degree of medical skill, there is no record that Hildegarde ever studied medicine, pharmacy or science. Her writings, however, show some knowledge of Hippocrates and the "fathers." Intentionally, she used common or vulgar terms in anatomy, for the names of diseases, for medicines, and for curative measures.

Hildegarde's medicine was a combination of reasoning, founded on experience. It was based on the "four elements and the four qualities." To this she added a practical regimen of bathing, diet, rubbing with ointments, and the application of plasters.

In her pharmacy there was a large use of herbs and potions. Amulets and relics of the saints were not interdicted. Prayers, pious ejaculations and faith were judiciously mixed with potions and pills.

It was said of Hildegarde that every case that came to her was healed—one hundred per cent. cures. This was not her claim, for in certain "dimness of the eyes," where the walrus skin was to be applied, she adroitly states, "either it will remove dimness of the eyes, or God does not permit this to be done."

"The efficiency of medicines is dependent upon their mode of preparation, or application, at the rising or setting of the sun, at the waxing or waning of the moon, by uttering certain prayers.

"Life consists of natural heat. The abdomen should be kept warm, and the bowels open. Vomiting and purging once a month is beneficial. The mouth and teeth should be kept clean. One should cease eating while he has still an appetite.

"Swamp water should always be boiled and allowed to cool before drinking. Well water is better to drink than spring water, and spring water than river water. River water is inferior to spring water; snow water is dangerous to health."

While in Hildegarde's time plant drugs predominate, animal remedies, the standby of the ancients, and even in more modern times, were freely used. "The heart of the vulture acts against poison; the blood of the crane facilitates childbirth; the lion's skin cures ailments of the head; the heart of the weasel benefits headache and deafness; a decoction of the mouse drives away the "falling disease'—epilepsy."

The gall of a fish, the far-famed remedy of Tobias, for restoring sight to the blind, appears in Hildegarde's remedies in many forms.

"The gall of the nightingale cures mistiness in the eyes. The liver of the swan purifies the lungs; the heron's liver cures stomach trouble; the liver and skin of the unicorn have great medicinal virtues. This animal, while fleeing from men, stops enthralled at the sight of girls, and if there are two or three girls together, it marvels so much the more, and is more quickly captured while its eyes are fixed on them."

At times, parts of animals and herbs were compounded with ceremony, applied with prayers and incantations, and used against "diabolical phantasms." "In the strength of Almighty God, I adjure Thee to safeguard me," was one of the ejaculations.

In ancient medicine, marvelous virtues were attributed to precious stones. With Hildegarde they were used to rout the devil, to banish anger and dullness, relieve thirst, and cure disease. "Gems cure by holding them in the hand, placing them next the skin, holding in the mouth, suspended about the neck, or making the Sign of the Cross with the stone."

"Gems are potent in the cure of disease and evil influences. There is great force in herbs, but equal and sometimes greater force in stones. The powers of herbs disappear with age, some plants are injurious; whereas the virtues of stones are almost all beneficial and remain permanent."

That the sick might not forget to give thanks upon recovery, Hildegarde prescribed that for nine days he should look upon the drug, gem or other healing agent and say, "As the spirit of the Lord filled the earth, so may His grace fill my body, that it may never be moved."

## Satan Among the Drugs

In medieval times, legends and fabulous stories took root, grew and blossomed as the weeds do now in the ruins of Hildegarde's Abbey. Mysterious beings inhabited the castles, spirits dwelt in the rocks, red maidens and black maidens sang in the fen and marsh, the raven croaked on the hillside. Even now we can sit on the devil's stone at Tuefelstein, climb his ladder at Tuefelsleiter, lunch in Tuefelskuche. So, we find the devil coming into pharmacy and delving among the drugs.

Hildegarde regarded the healing art as a literal fight against disease and the devil. The cause of illness was sin. "Satan and his

attending spirits pervade all living things, either in a friendly or hostile relationship."

In the litany she prayed that the people might be delivered from "magic," witchcraft and necromancy; from augury and liver divination; from the arts of the enchantress, who, by incantations, performs certain feats with beasts, or herbs, or stones, or images.

In her visions she saw the power of demons over herbs and magic virtues, and the operations of the demons with them. "In disease the devil must be exorcised, rendered harmless, and driven out, before a cure can be made. Some herbs cannot be endured by demons; to other herbs the devil joins himself. Demons use herbs to their own evil ends; by divine permission they give remedies whereby the sufferers may cease to feel pains and believe themselves cured."

"Demons are more thoroughly acquainted with the secrets of nature than are men. To become thoroughly acquainted with the natural power of things, men must practice the same long experimentation and exercise the same subtle ingenuity as have the demons.

"The herbs of the East are full of virtue, have a good odor, and good medical properties; those of the West are potent in magic art, but do not contribute much to the health of the human body."

"There are substances that work against the magic of the devil. Satan has little force where the fir tree grows, for the spirits of the air hate such spots. The holm-oak is hostile to spirits of the air; one who sleeps under its shade is free from diabolical illusions; fumigating a house with it drives out evil spirits.

"Certain herbs have divine effects, which are turned to use by those who follow magic. The juice of a certain herb, drunk in water, makes the person do or say whatever the magician says or does.

"In magic, the seed of herbs is used to extinguish lust. In invoking demons, magicians paint signs on their bodies with the herb hyoscyamus, and to their gods offer frankincense.

"Magic is an evil, diabolical art. Magic employs natural forces and substances—animals, minerals, plants, work out the maleficent ends.

"Man should not worship nor invoke the devil, nor seek knowledge of his works, 'since if you wish to know more than you should, you will be deceived by the old seducer.' "

While recognizing the marvels of magic, Hildegarde jealously differentiated them from divine miracles.

Condemning on one hand the use of illicit magic charms, Hildegarde does not abjure the use of herbs bound to the body or suspended from the neck. The effects of these physical ligatures or amulets are "divine," operating naturally and belonging to physical science. In this she follows the renowned Galen who, while adjuring superstitition, recognized amulets and suspensions as adjuncts to curative remedies.

### In the Herb Garden

Only shadows of the medieval herb gardens remain. Plotting them out from among the crumbled, weed-covered walls, we find square enclosures, surrounded by a wall or thick hedge, and against the wall a bank of plants, with sweet smelling herbs. Turfed paths ran with picturesque irregularity in all ways.

A covered way, or pergola, filled one side of the plot. In the midst of the garden was a fountain; there was also an arbor, with seats, canopied with rosemary, and a sundial.

Herbs grew in this garden. Herbs for the healing of the ills of mankind. Savory herbs for nourishing broths and cordials. Sweet-smelling herbs for refreshment of the body and soul. There were flowers to strew the floor and deck the altar of the sanctuary.

In this garden the nuns and monks labored diligently, and the earth brought forth.

This "Garden of Herbs"—a vineyard, a garden enclosed, was a place of rest and tranquillity, filled with sunlight and delicious scents. And in such a garden Hildegarde, in vision, saw God glorified in plant and flower, and found in the herbs "His good gifts, created to do man help and service."

In a later day, Hildegarde would have been called an Herb Doctor. Her tonics and her herb teas were extolled far and near. Not only did they cure, but they were wholesome as well. The mere scent of them was a tonic, and the users believed that through them they were kept in health.

Hildegarde's doctrine of herbs seems to us curious, but after all it was, in her time, reasonable, and, at the bottom, rational. Here we can review only a few of her tenets:

"Science is from God—even the science of health. From God, the virtues of herbs, and the diverse properties of juices, are known.

"The growing of herbs from earth are the marvelous effects of the Creator's will, but the operation is not without a material reason.

"Animal creatures from God have learned of remedies for the cure of their ills. From seeing animals use plants man has discovered many cures." (This sounds like Pliny, and those who came before him.)

"There are certain plants which were known to Adam, which if man could procure and eat, would enable him to labor and go without food for a long period." (This comes near the now known properties of the coca and the kola.)

"All living creatures were good before Adam's fall, but when Abel's blood stained the soil, noxious humours arose, and venomous reptiles and deadly plants were generated.

"An herb grows upward because of the element fire. The herb spreads outward because of the air and fire. Without earth the herb would have no consistency."

Moving toward the idea of a specific principle or alkaloidal body in poisons, Hildegarde states that some poisons prove fatal owing to the preponderance of one quality, others are deadly owing to their entire composition, their "specific form."

The statement that a poisonous compound multiplies its potency through the union of the species composing it, and has a stronger action than if it were simple, is a step toward a conception of a chemical compound.

"The dried root of asparagus, used to sprinkle the patient with spring water, will break the spell of witchcraft. Asparagus is likewise beneficial for toothache, for the relief of a tumor, or bladder trouble, when boiled in water and the potion drunk by the patient, fasting for seven days.

"The Mandrake will induce a sleep similar to death, but not a fatal sleep."

The Mandragora has been known and used from ancient times as an anæsthetic to subdue pain in operations. But Hildegarde's writings, for the most part, avoid surgery, and therefore we can hardly credit this allusion to its use in anæsthesia.

Plants were to be taken in specified seasons, at certain phases of the moon, and during particular conjunction of the planets. Living in an age when ceremony and ritual entered into every activity of life, Hildegarde prescribed the use of incantations and prayers.

We know that there are drug plants which are best harvested in sunshine, likewise there are plants which should be gathered in

the shade. It is still important in gathering herbs that due attention should be given to the almanac.

Alkaloid-bearing and aromatic plants must be harvested at certain stages of growth. These periods are certainly influenced by the weather conditions, and for success due attention must be given to the phases of the moon and the signs of the zodiac.

In Hildegarde's time the harvesting of crops, and especially the gathering of medicinal plants, was a serious, solemn occasion. The good offices of the Most High must be invoked, and evil influences exorcised by prayer and song.

Eight centuries after Hildegarde there still exists a need for the application of the methods of pharmacognosy to the cultivation, gathering and preservation of crude vegetable drugs.

Possibly we should approach the problems as did St. Hildegarde, in the spirit of Service rather than the spirit of Gain.

"The gatherer of herbs must be himself pure, and wear clean clothing.

"In plucking certain herbs, a circle should be marked about the plant, using gold, silver, ivory, the tooth of an animal, the horn of a bull, according to the nature of the herb."

The use of magic words and incantations in gathering herbs is to be condemned; but the use of the Sign of the Cross, and the repetition of the Lord's Prayer is to be commended.

Hildegarde's use of precaution in gathering herbs was not altogether foolish superstition; in her time it was a wise and sane practice.

The active principles of plants, toxic and otherwise, had not been identified in that remote day. They believed that a powerful invisible "something," sometimes evil, sometimes benign, dwelt in every herb, and even filled the atmosphere around it.

As a protection against myriads of unknown elements present especially in powerful medicinal plants, and likewise to preserve the potency of the plants, precautions and care were necessary.

We know that there are plants whose odors and emanations produce deleterious and uncomfortable effects by their presence. It is an act of wisdom to place oneself on the windward side of such as these.

There are plants whose juices are, to a high degree, acrimonious, and handling such plants incurs a liability to poisonous irritations.

To oil one's hands and skin, or to wear masks and gloves when handling such acrid substances, is sane and reasonable.

Herbs, with Hildegarde, have a medicinal power through their own inherent virtue, which may be enhanced through ceremonial. Hence she combined her herbs and her potions with prayers.

"Where one is bewitched by phantasms or magic words until he goes mad," the cross is brought into use, sometimes with the use of a certain food, again with the use of an herb passed under the arms of the cross, and at the same time this formula is recited: "As the splendor which the devil once possessed departed from him, so may this madness which harrasses you by varied phantasms and magic arts, by this holy herb be removed from you and depart from you."

The far-famed Mandrake receives due attention. "The Mandrake is composed of that earth of which Adam was created." In the Mandrake the influence of the devil is more potent than in other herbs; consequently, man is stimulated by it according to his desires. Hence it must be plucked with due regard to the signs of the stars. The Lord's Prayer must be recited, the root must be purified in pure water, steeped in wine and placed under the altar for seven days. This proceeding not only overcomes the Satanic influence, but imparts to the Mandrake its virtues.

Magicians make potions of Mandrake, Henbane and other herbs, which clog and stupefy the senses, and produce dreams, visions and apparitions. By these means they predict the future.

The two-fold character of the Mandrake is shown in the statement that when used with prayer and incantation, the shoots of the aspen, cedar or beech may be used instead of the Mandragora.

The Mandrake was administered internally, in wine or in powder, for its inherent medicinal action, but applied externally for its magic power. "The left half of the root, which resembles the human figure, should be pulverized, camphor added to it and eaten."

"The whole root of the Mandrake should first be worn bound between the breast and the naval for three days and three nights, then divided in halves and these worn for three days and nights."

"If a man is sad and in the dumps, after purifying the Mandrake in a fountain, let him take it to bed with him, hold it so that it will be warmed by the heat of the body, and say: 'God, who madest man from the dust of the earth, I now place next me that earth which has never transgressed, in order that I may feel that peace just as thou didst create it.'"

In the advance of the healing art, the herb garden has disappeared, herb lore has been forgotten. Alkaloids, synthetic compounds from the tar barrel, "dope" and patent medicines have attained to the place once held by herb teas.

We glory in the wonderful progress made in these centuries, but with wistful eyes we look back into the herbarium of Hildegarde.

### Saintly Pharmacy

Saints are a rarity in the drug store, but Hildegarde, the "Sibyl of the Rhine," is one that the student of pharmacy can claim as his own.

The Benedictines were skilled in pharmacy, pharmacology and therapeutics, acquired in part from the Arabians. Hildegarde followed the Benedictine rule—"learn the nature of herbs, and study the way to combine their various species for human health."

The Monastery, under Hildegarde, was a medical center, to which physicians resorted to gain the experience offered by the presence of the sick in large numbers, with a variety of afflictions. From among the Order certain members were selected and taught the "mysteries" of the art of the apothecary—a school of pharmacy. In the hospitals nurses were trained in the care of the sick.

Spacious, and well located within the Monastery grounds of Hildegarde, adjoining the "Infirmarum" or clinic, was the "Armarium pigmentorium," the drug shop—in common parlance, the Pharmacy.

From the pharmacy of the Benedictines came liquors, waters, cordials, syrups and confections, some of which still survive in European pharmacy. Our elixirs are of Benedictine origin. "Confection Benedictine" is the beginning of Confection of Senna.

In Hildegarde's land there were no drug stores or pharmacies. (The first recorded German pharmacy comes a century later, 1267.) The "Circulatores" or wandering quacks, and the Monastery were the sources from which medicines were obtained.

What a drug shop it was! this pharmacy of Hildegarde. Instead of the heavy musty smell of drugs, the air was filled with the sweet odors of the savory herbs, gathered and preserved with care, and hung high and thick over the timbered ceiling. There were earthern gallipots and jars filled with juices, confections, treacles, ointments, salves, cataplasms, theriacs, conserves, pills, and fat from the hog, goose and viper. In demijohns and jugs were tinctures,

wines, cordials, syrups, potions, and waters without end. In boxes of wood were roots cut, sliced and dried, as well as gums and dry drugs.

In a building adjoining, entered from the yard, hooded nuns plied their handicraft amid mortars, filtering bags, pelicans, water baths, circulatores, retorts and alembics. Here could be seen a moving, operating pharmacy engaged in distillation, filtration, fusion, infusion and sublimation—a veritable medieval pharmacal laboratory. "Secundum artem" ruled the operations. On a stone table lay a stained and well-worn formulary, written on vellum, in round characters, as though an engraved script. The formulary was Hildegarde's own, wrought from the labors of the Benedictines.

The operatives in this pharmacy were the nuns and monks who had been set apart for the work. They had passed through probationary periods; had taken solemn vows in the ceremonious initiation into their calling. The operations of the laboratory were carried on with prayers and pious ejaculations, invocating divine guidance.

The work of the laboratory was veiled from all save the initiated. Even the laboratory buildings were hidden among hedges and vines, guarded by locked gateways and doors, the keys to which dangled beneath the cross that swung from the belt of the hooded and cowled guards. To this day many of the formulæ of the Benedictines have been held inviolate within the Order.

Through the long medieval gloom the radiant flames of the torches held by saints, sinners and scientists, never ceased to glow. Among the students of medicine, pharmacy, botany and kindred arts, shining as a bright particular star, is the Abbess Hildegarde. Of her one biographer has well written, "Her feet in the mire and dust of lowly work, her hands on the harp, her head in the sunlight of prayer and the knowledge of God and His handiwork."

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## ADDENDA

### The Drugs of Hildegarde

The following is a partial list of the drugs recorded in the writings of Hildegarde, as noted in "Handbuch der Pharmakognosie"—Tschirch. The synonyms are mainly those of Fischer-Benson and Berendes.

Triticum (Triticum vulgare)
Siligo (Secale Cereale)
Avena (Avena sativa)
Hordeum (Hordeum vulgare)
Spelta (Triticum Spelta
Pisa (Pisum sativum arvense)
Faba (Vicio Faba)
Lens (Ervum Lens)
Hirs (Panicum miliaceum)
Venich (Panicum italicum)
Hanff (Cannabis sativa)
Ratde (Lolium temulentun?)
Galgan (Alpinia Galanga)
Zituar (Curcuma Zedoaria)
Ingeber (Zingiber officinale)
Piper (Piper nigrum)
Kumel (Cuminum Cyminum)
Bertram [Piretrum] (Anacyclus officinarum?)
Liquiricium (Glyzyrrhiza glabra)
Cinnamomum (Cinnamomi)
Nux moschata (De arbore nucis moschatae)
Rosa (Rosa centifolia und gallica)
Lillium (Lillium candidum)
Psillium (Plantago Psyllium)
Cubebo (Piper Cubeba)
Gariofiles (Eugenia caryophyllata)
Cristiana (Helleborus niger)
Lunckwurz (Pulmonaria officinalis)
Hirtzunge (Scolopendrium vulgare)
Quenula (Thymus Serpyllum)
Gentiana (Gentiana lutea)
Andron (Marrubium vulgare)
Hirtzswam (Elaphomyces granulatus)
Lavendula (Lavandula spica)
Foenugraecum (Trigonella Foenum graecum)
Sysemera (aufgequollene Eileiter des Frosches?)
Pfefferkrut (Lepidium latifolium)
Scherling (Conium maculatum)
Ganphora (Dryobalanops Camphora)
Amphora (Rumex acetosa)
Huswurtz (Sempervivum tectorum)
Stichwurtz (Bryonia alba)
Wuntwurtz (Euphrasia officinalis)
Sanicula (Sanicula europaea)
Heylheubt (Colchicum variegatum)
Farn [Filix] (Aspidium Filix mas)
Haselwurtz (Asarum europaeum)
Herba Aaron (Arum maculatum)
Humela (vielleicht gar keine Pflanze)
Wulffesmilch (Euphorbia Esula?)
Dauwurtz (Leontodon Taraxacum?)
Brachwurtz (Euphorbia Esula)
Funfblatt (Potentilla reptans)
Mandrogora (Mandragora vernalis)
Winda (Convolvulus sepium)
Boberella (Physalis Alkekengi)
Binsuga (Melissa officinalis)
Sunnenwirbel (Cichorium Intybus)
Hoppho (Humulus Lupulus)
Lilim (Bryonia)
Selba (Salvia officinalis)
Ruta (Ruta graveolens)
Hyssopus (Hysopus officinalis)
Feniculum (Foeniculum capillaceum)
Dille (Anethum graveolens)
Petroselinum (Petroselinum sativum)
Apium (Apium graveolens)
Kirbele (Anthriscus Cerefolium)
Pungo (Veronica Bechabunga)
Burncrasse (Nasturtium officinale)
Burtel (Portulaca sativa oder oleracea?)
Bachmyntza (Mentha aquatica)
Myntza major (Mentha silvestris)
Allium (Allium sativum)
Unlauch (Allium Cepa)
Kole (Brassica oleracea)
Wiszgras (Weggrasz et Suregrasz et Roemes grasz)
Kurbesa (Cucurbita)
Raba (Brassica Rapa)
Retich (Raphanus sativus)
Latich [Lactucae] (Lactuca sativa)
Wilde Latich (Silvestres Lactucae) (Lactuca Scariola)
Herba Senff (Sinapis alba)
Synape (Sinapis nigra)
Alant (Inula Helenium)
Papaver (Papaver somniferum)
Babela (Malva silvestris)
Cletta (Arctium Lappa)
Urtica (Urtica dioica)

Plantago (Plantaginis major)
Viola (Viola odorata)
Melda (Artriplex hortensis)
Biboz (Artemisia vulgaris)
Cle (Trifolium pratense)
Wermuda (Artemisia Absinthium)
Bilsa (Hyoscyamus niger)
Reynfan (Tanacetum vulgare)
Dost (Origanum vulgare)
Garwa (Achillea Millefolium)
Agrimonia (Agrimonia Eupatorium)
Dictamnus (Dictamnus albus)
Metra Metera (Chrysanthemum Parthenium)
Musore (Hieracium Pilosella)
Swertula (Gladiolus? Iris?)
Hatich (Sambucus Ebulus)
Nachtschade (Solanum nigrum)
Ringula (Calendula officinalis)
Wullena (Verbascum Thapsus)
Gamandrea (Teucrium Chamaedrys)
Centaurea (Erythraea Centaurium)
Poleya (Mentha Pulegium)
Beonia (Paeonia officinalis)
Bathenia (Betonica officinalis)
Sichterwurtz (Helleborus niger?)
Sichterwurz (Veratrum album)
Bibenella (Pimpinella Saxifraga)
Agleya (Aquilegia vulgaris)
Springwurtz (Euphorbia Lathyris)
Berwurtz (Meum athamanticum)
Steinbrecha (Saxifraga granulata)
Grintwurtz (Chelidonium majus)
Lubestuckel (Levisticum officinale)
Ebich (Hedera Helix)
Ybischa (Althaea officinalis)
Denemarcha (Valeriana officinalis)
Nebetta (Nepeta Cataria)
Cranchsnabel (Erodium moschatum)
Consolida (Symphytum officinale)
Byverwurtz (Aristolochia Clematis)
Grensing (Potentilla argentea)
Morkrut (Pastinaca sativa)
Gensekrut (Potentilla anserina)
Linsamo (Samen von linum usitatissimum)
Hunsdarm (Alsine media)
Nyesewurtz (Veratrum album)
Ysena (verbena officinalis)
Satereia (Satureia hortensis)
Wolfesgelenga (Arnica montana)
Dornella (Tormentilla erecta)
Scarleya (Salvia Sclarea)
Storcksnabel (Geranium Robertianum?)
Benedicta (Genum urbanum)
Birckwurtz (Tormentilla erecta)
Astrencia (Imperatoria Ostruthium)
Ertpeffer (Sedum acre)
Brema (Rubus spec.)
Erpere (Fragaria vesca)
Waltbere (Vaccinium Myrtillus)
Fungi.
Aloë (Aloë vulgaris)
Thus (Weihrauch)
Myrrha.
Balsamum
Mel.
Zucker.
Lac.
Butyrum
Sal.
Acetum
Meranda (Wein- oder Bierkaltschale)
Ova
Pix
Hartz (Nadelhölzern)
Sulphur
Wichim (Vicia sativa)
Milium (Panicum miliaceum)
Semen Lini (Linum usitatissimum)
Balsamita (Tanacetum Balsamita)
Stur (Amarantus Blitum)
Pastinaca (Pastinaca sativa)
Polypodium (Polypodium vulgare)
Vehedistel (Carduus Marianus)
Fictaria (Ranunculus Ficaria?)
Weyt (Isatis tinctoria)
Hymelsloszel (Primula officinalis)
Huflatta minor (Tussilago Farfara)
Asarum, auch Aserum (Asarum europaeum)
Hirsceswurtz (Peucedanum Cervaria)
Scaampin Scampina (Veratrum album)
Hartenauwe (Hypericum perforatum)

Thymus (Thymus vulgaris)
Plionia (Paeonia officinalis)
Dorth (Lolium temulentum)
Ebulus (Sambucus Ebulus)
Birbaum (Pirus communis)
Nuszbaum (Nux) (Juglans regia)
Quittenbaum (Cydonia vulg.)
Persichbaum (Amygdalus persica?)
Cerasus (Prunus Cerasus)
Spirbaum (Sorbus domestica)
Amydalus (Amydalus commun.)
Kestenbaum (Castanea Vesca)
Nespelbaum (Mespilus germanica)
Feikbaum (Ficus Carica)
Laurus (Laurus nobilis)
Oleybaum (Olea europaea)
Bontziderbaum (Citrus medica)
Cedrus (Juniperus commun.)
Cypressus (Cupressus sempervirens)
Sybenbaum (Juniperus Sabina)
Abies (A. pectinata)
Tilia (Tilia europaea)
Fagus (Fagus silvatica)
Asch (Fraxinus excelsior)
Aspa (Populus tremula)
Arla (Alnus glutinosa)
Ahorn (Acer Pseudoplatanus)
Ybenbaum (Taxus baccata)
Bircka (Betula alba)
Spinelbaum (Evonymus europaeus)
Hagenbucha (Carpinus Betulus)
Wida (Salix Caprea)
Wacholderbaum (Juniperus communis)
Holderbaum (Sambucus nigra)
Neltzbaum (Berberis vulg.)
Hartbrogelbaum (Cornus sanguinea?)
Iffa (Ulmus campestris)
Harbaum (Prunus Padus?)
Agenbaum (Carpinus Betulus?)
Spinae (Prunus spinosa)
Vitis (Vitis vinifera)
Fumus (der Rauch der Holzer)
Unguentum Hilari
Contra Scrophulas
Palma (Phoenix dactylifera)
Picea (Picea excelsa)
Tribuli (Rosa canina)

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## PSEUDO EPHEDRINE FROM EPHEDRA ALATA

By O. F. Black and J. W. Kelly

ALTHOUGH NAGAI isolated the alkaloid, ephedrine, as long ago as 1887 from the Chinese drug plant, Ma Huang, it is only within a few years that its remarkable value as an alleviative in diseases of the respiratory system has been generally recognized. The Chinese herbalists, however, have used Ma Huang as a remedy for coughs, cold, etc., for many centuries, and the reason for its long delayed arrival in Western medicine may be placed on the general ignorance of Oriental language and customs. Ma Huang is an Ephedra but its exact botanical identity is still a matter of dispute. The basic substance obtained from it consists of ephedrine, mixed with a small amount of an isomeric alkaloid named pseudo ephedrine. The latter was first obtained by Merck.[1]

[1] Merck's Ber., 1893, 13.

These two isomeric modifications of ephedrine have somewhat similar physiological action and can be converted one to the other by fairly simple chemical methods. Quite recently another alkaloid from Ma Huang has been described, 1-methylephedrine. It differs from the other two, which both have the same formula $C_{10}H_{15}ON$, by having *two* methyl groups instead of one attached to the single N atom, making its formula $C_{11}H_{17}ON$.[2] Its medicinal properties have not as yet been reported.

The family, Ephedra, seems to be a numerous one with members scattered all over the world, several being natives of this country. Few have been thoroughly investigated chemically but so far only the Chinese variety, Ma Huang, has been found to contain ephedrine. It was the writers' good fortune to come into possession recently, through the kindness of Dr. Walter T. Swingle, of a small sample of a plant of this species from Morocco, *E. alata,* and a basic substance was isolated from it which proved to be pseudo ephedrine.

*Experimental:* This material, which consisted of dried twigs, was finely ground in a mill and 30 grams of the air-dried powder was moistened with an aqueous 2 per cent. solution of potassic carbonate allowed to stand and partially dry over night and then transferred to a soxhlet apparatus and continuously extracted with chloroform for several hours. The chloroform extract, after standing over anhydrous sodium sulphate, was concentrated to small volume and shaken out three times with dilute hydrochloric acid solution. The acid extract was next made strongly alkaline with solid potassic carbonate and shaken out with chloroform. The last extract after removing the solvent and allowing it to stand some time in a desiccator crystallized in a solid mass of rosette-shaped crystals. In order to show the identity of the substance thus prepared advantage was taken of the observation of Chou,[3] who found that the oxalates offered a very convenient and efficient method of separation and distinguishing the isomers, ephedrine and pseudo ephedrine, the oxalate of the former being quite insoluble in water, while the same salt of the pseudo modification is readily soluble. The crystalline residue therefore was treated with an aqueous solution of oxalic acid in which it dissolved without difficulty. This indicated the pseudo form. To bring further proof to bear on the matter the free base was regenerated from

[2] *Journ. Chem. Soc.*, London, 1927, 2056.
[3] *Journ. Biol. Chem.*, LXX, 1, September, 1926.

the oxalate by making it alkaline with $K_2CO_3$ and shaking out with $CHCl_3$. The crystal residue left by evaporating the $CHCl_3$ was recrystallized three times from alcohol whereupon it showed a melting point of 116°. The hydrochloride formed by adding an alcoholic solution of HCl to the free base and evaporating yielded colorless needles which melted at 180°, thus proving beyond any reasonable doubt that the substance in hand was the pseudo ephedrine.

The yield of crude base from *E. alata* was about 1 per cent., which compares very favorably with the yield from Ma Huang, stated by Chou as only 0.26 per cent. As pseudo ephedrine can be converted into ephedrine it would seem that *E. alata* may furnish a new source of the more valuable drug. The present excessive demands for ephedrine and consequently for Ma Huang may eventually use up all available supplies of that plant. This appears the more probable as it is understood that the plant takes fifty years to approach maturity. There is a prospect, therefore, that ephedrine from plant sources may ever become scarcer and more prohibitive in cost. The remedy for this, in the opinion of the writers, rests with the synthetic chemist. Ephedrine has already been synthesized in the laboratory. Späth and Göhring [4] were able, starting with propyl aldehyde, to attain this end through the following reactions:

I. $CH_3CH_2CHO + Br_2 = CH_3CHBr\,CHO + H\,Br$

II. $CH_3CH\,Br\,CHO + H\,Br + CH_3OH = CH_3CH\,Br\,\underset{OCH_3}{\overset{Br}{CH}} + H_2O$

III. $CH_2CH\,Br\,\underset{OCH_3}{\overset{Br}{C}} + C_6H_5Mg\,Br = C_6H_5\underset{OCH_3}{\overset{Br}{CHC}} - CH_3 + Mg\,Br$

IV. $C_6H_5C\,H\,\underset{OCH_3}{\overset{Br}{C}}\,H\,C\,H_3 + NH_2CH_3 = C_6H_5CH\,OH\,\underset{OCH_3\,NHCH_3}{CH}$

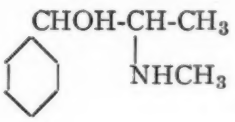
V. $C_6H_5CH\,\underset{OCH_3\,NHCH_3}{CH} + H\,Br = C_6H_5CH\,\underset{OH\,NHCH_3}{CH} - CH_3 + CH_3\,Br$ (Ephedrine)

This synthesis incidentally gives proof of the structural formula of ephedrine which has been pointed out previously by Ladenburg

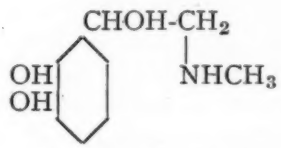
[4] *Monatsch. f. Chem.*, 1920, LVIII, 1268.

and Oelechlagel.[5] It is a comparatively simple formula as alkaloids go, and it is interesting to note its close resemblance to that of the hormone from the suprarenal gland, adrenalin. It is therefore not surprising that the two compounds should show such marked simi-

*Ephedrine*




*Adrenaline*




larity in their physiological action.[6] It is the writers' belief that a practical commercial method will be found for the synthetic preparation of ephedrine, and that this valuable drug which is now so difficult to obtain will then become abundant enough to satisfy the demand.

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## TITROMETRIC ESTIMATION OF TRIVALENT ARSENIC BY OXIDATION

**By Frederick G. Germuth**

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THE METHOD here presented is recommended for employment where a high degree of accuracy is of paramount importance, and advocated where ease of manipulation in the technique involved is desirable and sought. The method is advantageous, also, in that the utilization of an unstable indicator is obviated, the potassium permanganate solution used producing a distinct and definite end-point, while the addition of acid sodium carbonate—so essential in the familiar titration of an arsenite solution with standard iodine—is eliminated.

Careful consideration as well as consistent observation tend to confirm and emphasize the established fact that though less time is required for the quantitative determination of trivalent arsenic by the procedure exploited, the measure of accuracy attained justifies its

[5] *Ber. Chem. Ges.*, 1889, 22, 1923.
[6] Abel, J. J.: *Science*, October 14, 1927.

employment in work of an experimental character where high sensitivity of reaction, and, to a greater extent, an established accuracy regarding results, are fundamentally important.

### Method of Determination

The determination is carried out in this manner: 0.5 gram of the substance containing arsenic in the arsenious state is dissolved in sufficient 1:2 solution of $H_2SO_4$ or HCl (the former is preferable), and warmed to facilitate solution (in the case of alkali arsenites, solution is effected more rapidly by 15 per cent. KOH). When this is complete, 100 cubic centimeters of distilled $H_2O$ are added; the careful addition of 2 N KOH is resorted to until the contents of beaker are slightly alkaline to methyl red; four cubic centimeters of 5 N $H_2SO_4$ are now added, followed by two drops of 0.2 per cent. KI solution.

The whole is thoroughly stirred, and distilled $H_2O$ added until the volume of solution is about 200 cubic centimeters. A solution of 0.1 N $KMnO_4$ is now carefully run in from burette, until the characteristic shade produced by slight excess of $KMnO_4$ is discerned, indicating end-point of reaction. One cc. of 0.1 N $KMnO_4$ solution = 0.00495 gram of $As_2O_3$. The minute quantity of $KMnO_4$ required to oxidize the KI employed as catalyst is deducted, and amount and percentage of As or its compound calculated.

### Standardization of Oxidizing Solution

Standardization of the potassium permanganate solution may be accomplished by various means and with different reagents; the end sought is frequently attained by the employment of iron, in the form of wire of guaranteed purity; ferrous ammonium sulfate ($FeSO_4.(NH_4)_2SO_4.6\,H_2O$), or potassium tetraoxalate ($KHC_2O_4.H_2C_2O_4.2\,H_2O$), the two latter compounds, as is evident, containing water of crystallization. (The utilization of elementary antimony as a standardizer for permanganate solutions has been occasionally promulgated; the metal, however, has acquired but a small degree of popularity in this most essential procedure of the Science.)

The use of Sörensen's sodium oxalate (obtainable from the National Bureau of Standards) is preferred by the author for this purpose, as its employment insures greatest accuracy, the chemical compound under discussion being easily obtainable in a state of ex-

ceptionally high purity, thus doing away with the necessity for adopting further methods of purification, such as removal of soluble extraneous substances constituting impurities, by precipitation; separations based on differences of solubility in organic solvents; and recrystallization; hence, possessing the additional advantage of effecting a material saving in difference in the time required to accomplish this important step.

The chemical reaction occurring when potassium permanganate is standardized against sodium oxalate is represented by the following equation:

$$2\ KMnO_4 + 5\ Na_2C_2O_4 + 8\ H_2SO_4 = K_2SO_4 + 2\ MnSO_4 + 5\ Na_2SO_4 + 10\ CO_2 + 8\ H_2O.$$

The equation shows that one liter of 0.1 N $Na_2C_2O_4$ contains 6.70 grams of the salt; a solution of $KMnO_4$ of the same normality contains in the same volume, 3.16 grams of the oxidizing substance; thus 1 cc. of 0.1 N $KMnO_4$ is chemically equivalent to 0.0067 gram of $Na_2C_2O_4$.

The permanganate solution should, of course, be allowed to stand for at least three days, and then filtered through an asbestos mat to free the solution of any $MnO_2$ that may be present, before standardization is attempted. The fact that sodium oxalate (Sörensen) is free of water of crystallization and of combination, and furthermore, is not hygroscopic—thereby eliminating any discrepancy with its consequent error that may, and indeed, generally will result from a lack of knowledge concerning the actual amount or extent of hydration—furnishes further evidence of its fitness and applicability as the superior standard for ascertaining and adjusting the normality and concentration of volumetric oxidizing solutions of potassium permanganate.

### Potassium Iodide as Catalyst

Attention is directed to the fact that the presence of KI, in extremely small quantity, exerts a powerful catalytic action, producing instantaneous and complete oxidation of $As^{III}$ to $As,^{V}$ and quantitative reduction of the permanganic salt.

### Effect of Other Iodides

The author, with the objective of learning whether the substitution of some other iodide for that of the potassium salt would give similar results, employed manganese iodide and sodium iodide

as catalysts. The use of the former compound disclosed the fact that oxidation in its presence was greatly retarded, while the action of sodium iodide, superior to that of the manganese derivative, was slower in producing the catalysis sought than when potassium iodide was utilized for this purpose.

### Effect of Higher Temperatures

Experiments were made to determine the effect of heat upon the results obtained by the method under consideration. It was ascertained that the accuracy of the procedure is unimpaired by differences in temperature from 15 degrees C. upward to 95 degrees C., and results were equally satisfactory in hot or cold solutions of arsenites.

### Summary

A method for the determination of arsenious acid and arsenites has been presented, in which the presence of potassium iodide in traces exerts a pronounced catalytic action, causing oxidation of trivalent arsenic to pentavalent arsenic by potassium permanganate to take place readily and completely, with corresponding reduction of the permanganate.

A high degree of accuracy combined with ease and speed of manipulation during the process of analysis—in addition to the elimination of the starch indicator and acid sodium carbonate reagent required in the iodimetric procedure generally utilized for this specific chemical determination—render this method preferable to the older, and furnish sufficiently strong reasons, it is believed, for its usage in experimental and routine analytical work.

Experiments made in which manganese iodide and sodium iodide were substituted for the potassium salt of hydriodic acid furnish proof that the potassium compound possesses greatest energy as a catalyzing agent. Results were equally accurate in cold and hot solutions of arsenites ranging in temperature from 15 degrees C. to 95 degrees C., a slight excess of potassium permanganate solution producing a distinct coloration in arsenite solutions in which the temperature varied between the figures indicated.

## ACHIEVEMENTS OF NINETEEN TWENTY-SEVEN*

MAN'S MASTERY of the air was improved, diseases were conquered, new chemicals were produced, the probing of the heavens, unknown lands, and the mysteries of the human past was continued, communication continued to compress the dimensions of the world and the human mind and temperament were further explored in the science researches and achievements of 1927.

Step by step great achievements of science are built. The advances that come to fruition in one year had their foundations laid by the labors of the past year and they will in their turn contribute to the accomplishments of future years.

Some of the principal science achievements and events of 1927 were:

### Aeronautics

Col. Charles A. Lindbergh made the first non-stop flight from New York to Paris, the first of a series of successful transoceanic flights by American civilian pilots using commercial aircraft and engines designed and built in the United States.

Aerial express service inaugurated on five routes, including the transcontinental.

Passenger air lines spanning the nation were inaugurated.

Plans for an airship line making the trip from Seville, Spain, to Buenos Aires in three days were announced by the German Zeppelin Works.

More airways were lighted and placed under government supervision.

Airways maps were published by the Coast and Geodetic Survey.

Installation of radio directional beacons and two-way radio communication between plane and ground upon civil airways was begun by Department of Commerce.

Substitute for goldbeaters' skin as gas cell fabric for airships was developed by the U. S. Bureau of Standards, reducing cost one-half and permeability one-half.

Airplanes of novel design, such as the autogiro and Hill's ptero-

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dactyle, and special devices, such as the Handley Page slot and aileron control, promised to make flying safer.

A committee of weather experts, sponsored by the Daniel Guggenheim Fund for the Promotion of Aeronautics, began an investigation of how the science of meteorology can best aid aviation.

Weather maps showing conditions at eight different layers were inaugurated by the Weather Bureau as an aid to aviation.

The utility of the earth inductor compass, the relativity novel means of using the magnetism of the earth for determining direction, was demonstrated when it was used by trans-Atlantic and trans-Pacific fliers.

## Anthropology and Archæology

The Glozel tablets in France, alleged to bear the earliest alphabet, continued to cause acrimonious differences of opinion among archæologists.

Excavations at the Swedish Island of Gothland showed that the medieval city of Visby held great commercial importance because of iron trade.

A concession from the Greek government for the excavation of the Agora of Athens was obtained by the American School of Classical Studies in Athens, and the huge project was assured by financial backing from an anonymous source.

The Italian government undertook the excavation of Herculaneum, overwhelmed in 79 A. D. by the eruption of Mt. Vesuvius.

Digging among the ruins of Pompeii brought to light new houses containing art treasures and wall paintings of great interest.

An ancient Roman naval port, headquarters of the fleet that patrolled the Rhine in the first century A. D., was excavated near Cologne, and many small objects found among the complex ruins.

Prof. Peter Kosloff, planning a new Russian expedition to Tibet, reported the results of his latest discoveries in Mongolia, particularly ruins of an ancient Chinese city.

New light on everyday life of the knights who set out to recapture the tomb of Christ from the heathen was revealed by study of a crusader's castle in Palestine by a Metropolitan Museum of Art expedition.

Two new Canaanite temples were excavated at Beisan by the Palestine Expedition of the University of Pennsylvania Museum.

A museum at Jerusalem for Palestine antiquities was provided by a gift of $2,000,000 made by John D. Rockefeller, Jr.

Previously unknown Mesopotamian kings who ruled 5000 years ago were discovered at Ur of the Chaldees by the joint expedition of the University of Pennsylvania Museum and the British Museum.

A Sumerian temple to the Earth Goddess, built more than 5000 years ago, was unearthed in the buried city of Kish by the Field Museum-Oxford University Joint Expedition to Mesopotamia.

A temple to the Egyptian war-god, Montou, built at about 2200 B. C., was found in Egypt by French scientists, revealing the existence of a hitherto unknown king.

Discovery of a tomb believed that of the great architect Imhotep was reported by Cecil Firth, excavating at Giza for the Egyptian Antiquities Department, and later he reached what appeared to be the entrance to the burial chamber of King Zoser.

Results of an extensive survey of the country of the Hittites in Asia Minor were reported and excavations of a Hittite mound begun by an expedition of the Oriental Institute of the University of Chicago.

The source of the jade-like stone used by the Aztecs was found at Zimapan, by Prof. Ramon Mena, of the Mexican National Museum.

Magnificent frescoes by ancient Maya artists were discovered at Chichen Itza in Yucatan by the Carnegie Institution expedition.

Important ruins of a prehispanic civilization that bridges the gap between the Pueblo culture in the southwest and that of the more advanced culture of the Aztecs and Mayas in southern Mexico were investigated.

A Soviet expedition to Mongolia headed by Prof. Peter K. Kozloff brought back botanical, zoological and archæological specimens of great value.

The Rawson-MacMillan Arctic Expedition of the Field Museum, led by Donald B. MacMillan, set out for Labrador and Baffin Land to collect anthropological, botanical, geological, and zoological material.

The general belief that Neanderthal man was a side-shoot from the evolutionary stem with no modern descendants was challenged by Dr. Ales Hrdlicka, of the U. S. National Museum, who holds evidence indicates that Neanderthal man was one of modern man's ancestors.

The evolution of man as such began millions, instead of thousands of years ago, and it was not from an ape-like ancestor, Dr. Henry Fairfield Osborn, of the American Museum of Natural History, declared; while Dr. William K. Gregory, of the American Museum of Natural History held that the human race rose in Asia from a distinctly ape-like creature.

Sir Arthur Keith, noted English anthropologist, declared his belief in the descent of man from a distinctly ape-like ancestry, as against the prevailing doctrine that apes and men have parallel but distinct lines of descent.

Skulls dating from a period intermediate between the Old and the New Stone Ages were found in Uganda, Africa, by the Cutler Expedition.

Intact stone graves typical of the ancient Indian culture that centered at Etowah, Georgia, were donated to a number of American museums by Prof. Warren K. Moorhead, of Phillips Academy, Andover, Mass.

German autopsies on 30,000 Egyptian mummies showed that decayed teeth increased progressively as the Egyptians became more civilized and that syphilis was practically non-existent in ancient Egypt.

The trail of ancient man in the far northwest was followed by ethnologists of the Smithsonian Institution, who collected material from old burials and studied customs in Alaska.

The "Burnt Rock" mounds in Texas were found to contain records of three prehistoric Indian civilizations.

Skeletons of the transition period at the time when prehistoric Indians of the southwest changed from the basket-making age to the pottery-making age were found at Chaco Canyon, New Mexico.

Bones of extinct animals discovered together wth stone implements in Oklahoma, Texas, and New Mexico, were examined by a number of scientists who declared that they indicate the existence of man on this continent during the glacial period.

The theory that clothing was first adopted by primitive men chiefly as a protection against insects, was advanced by Dr. Knight Dunlap, professor of psychology at Johns Hopkins University.

The Huxley Memorial Medal of the Royal Anthropological Society was presented to Dr. Ales Hrdlicka, anthropologist of the U. S. National Museum.

## Astronomy

An amateur astronomer named Blathwayt, at Braamfontein, South Africa, discovered a new comet on January 13.

An amateur astronomer, William Reid, of Rondebosch, South Africa, discovered a new comet on January 26.

The Pons-Winnecke comet, which made one of its sexennial visits to the earth's neighborhood, was detected on March 3 by Dr. George Van Biesbroeck, of the Yerkes Observatory, Willams Bay, Wis. It came within 3,500,000 miles of the earth on June 27, closer, with one exception, than any comet had been known to come in the past.

A new comet was discovered on March 10 by Dr. Carl L. Stearns, of the Van Vleck Observatory of Connecticut Wesleyan University.

The Grigg-Skjellerup comet was discovered on March 30 by Dr. George Van Biesbroeck, of the Yerkes Observatory.

An Australian justice of the peace and amateur astronomer, Walter F. Gale, discovered a new comet on June 7.

Schaumasse's periodic comet was observed on its return on October 4 by Prof. Van Biesbroeck, of the Yerkes Observatory, and possibly by Gerald Merton, of the British Royal Observatory a little earlier.

Encke's comet, a periodic visitor, was found on November 12, as it came near the earth again, by Prof. George Van Biesbroeck, of the Yerkes Observatory.

A naked eye comet visible in both the northern and southern hemispheres was discovered December 3 by J. F. Skjellerup, Australian amateur, and was visible just before Christmas.

A new star was located in the Milky Way by Dr. Max Wolf, of the Heidelburg Observatory in Germany.

A comet and a nova, or new star, were discovered within three days by two German astronomers, Drs. A. Schwassman and Wachmann.

Prof. Joel Stebbins, of the University of Wisconsin, announced the discovery that the satellites of Jupiter always keep the same side turned toward their parent planet, just as the moon does toward the earth.

An eclipse of the sun on June 29, visible in England and Norway, was seen at certain points along the path of totality by astron-

omers from the British Royal Observatory and the Hamburg Observatory in Germany, though Amercan astronomers in Norway were unable to see any of it on account of cloudy weather.

The aid of the Canadian Mounted Police, Catholic missionaries to the Eskimoes, fur trappers and others was asked by Dr. Willard J. Fisher, of the Harvard College Observatory, in observing the total eclipse of the moon on June 15.

Discovery of just how the solar radiation varies was announced by Dr. C. G. Abbot, of the Smithsonian Institution.

Many large sunspots were observed, and magnetic storms on the earth took place in apparent conjunction with them.

The possibility that stars may be liquid was advanced by Prof. J. H. Jeans, English astronomer.

Basalt, a rock common on the earth, is not present on the surface of the moon, Dr. Fred E. Wright, of the Carnegie Institution, told members of the National Academy of Sciences, in reporting a series of studies he had made with a new instrument.

The sun and the nearby stars may be in a vast cloud of cosmic "dust," said Prof. Edward S. King, of Harvard Observatory, thus causing the more distant stars to appear redder than the nearer ones, an effect that has actually been observed.

The radius of the universe was estimated as one hundred million light years by Prof. E. T. Whitaker, of Edinburgh University, in a report to the British Association for the Advancement of Science.

In the hands of amateur astronomers in all parts of the world, his invention, the spectrohelioscope, may go far towards solving outstanding solar mysteries, Dr. George Ellery Hale, honorary director of the Mt. Wilson Observatory, declared.

A sixty-inch reflecting telescope, the largest in the southern hemisphere and the third largest in the world, was ordered for the new South African station of the Harvard College Observatory, which will replace the former station at Arequipa, Peru.

The solar wave lengths in the unexplored regions of the spectrum were mapped by the U. S. Bureau of Standards in co-operation with Allegheny Observatory.

The largest disk of optical glass ever cast in the United States was made by the U. S. Bureau of Standards, the reflecting telescope blank being of borosilicate crown glass, 70 inches in diameter and 12½ inches thick.

## Biology

A ten-million-dollar war was waged against the European corn borer in the Corn Belt states by the Department of Agriculture and declared successful.

Three botanists, Dr. A. B. Stout, Dr. Ralph McKee and E. J. Schreiner announced the development of a fast-growing, hybrid poplar to meet the demands for wood pulp.

Cells, usually assumed to be short lived, were found still living in the heartwood of redwood trees a century old, it was reported by Dr. D. T. MacDougal, of the Carnegie Institution of Washington, and Dr. G. M. Smith, of Stanford University.

Small amounts of copper were found to make low-grade muck lands highly productive, according to E. L. Felix, of Cornell University.

The Tennessee State Supreme Court, in a decision on appeal in the famous Scopes Case, declared the anti-evolution law constitutional, but so worded its decision as virtually to nullify the law. John Scopes was excused from paying the fine levied against him for violating the statute, because of an error on the part of the judge presiding at his trial.

Efforts made in thirteen states to pass anti-evolution statutes were unsuccessful.

X-rays applied to the reproductive cells of animals and plants were found to speed up the rate of evolutionary change over a thousand per cent. This work was done on fruit flies by Prof. H. J. Muller, of the University of Texas, and on tobacco plants by Prof. T. H. Goodspeed and Prof. A. R. Olson, of the University of California.

Natural evolutionary changes in shell fish within sixty years, producing distinctly recognizable animal varieties in a lake in Wisconsin, were reported by Dr. Frank C. Baker, curator of the museum of natural history of the University of Illinois.

Chemical affinities between the milks of related animals were discovered by Prof. H. R. Marston of the University of Adelaide.

Eggs of the marine worm, Nereis, were fertilized without fathers, by the use of an electric current, in the laboratory of Dr. Ware Cattell, of Memorial Hospital, New York City.

Dr. Barnet Sure, of the University of Arkansas, has shown by experiments with rats that a poorly nourished mother, whose bodily

stock of vitamin B is subnormal, becomes unable to pass along this necessary food element to her nursing offspring.

The female sex hormone, or gland essence that causes typically feminine reactions and development in animals, was discovered in male animals as well as female, by Dr. Otfried O. Fellner, of Vienna.

The tuberculin testing of fowls to weed out avian tuberculosis was advocated by Dr. John R. Mohler, chief of the U. S. Bureau of Animal Industry, at the Third International Poultry contest held at Ottawa, Canada.

Mathematic studies of athletic records show that the one for the 880-yard run should be most easily broken, Dr. Earle R. Hedrick, of the University of California, stated.

Dr. Raymond Pearl, director of the Institute for Biological Research at the Johns Hopkins University, announced a theory based on laboratory observation of yeast, bacteria and fruit flies, that biological and human populations rise and fall in accordance with a universal law.

Congress passed a bill to provide for the collection and care of a herd of the nearly extinct Texas longhorn cattle, in the Wichita National Forest, Oklahoma.

A program for the scientific study and administration of the great elk herds of the Yellowstone region was planned by a co-operative committee of the national, state and private bodies interested.

The First International Congress of Soil Science was held in Washington in June and attracted scientists from many foreign countries.

A serious plague of mice occurred in Kern County, California, during January and February.

A new mosquito poison based on formaldehyde and said to be the most efficient yet devised, was announced by E. Bouband, of the Pasteur Institute of Paris.

Rediscovery of the straight-billed reed runner, a bird of Uraguay first noted by Darwin in 1831, of which all trace had been lost for nearly 100 years, was made by C. C. Sanborn, of the Captain Marshall Field South American Expedition, of the Field Museum.

## Chemistry

Experiments by H. S. Cooper, of Cleveland, showed that the light-weight metal beryllium or its alloys is suitable for airship frames and light-weight pistons.

The new chemical element rhenium was obtained in pure form by its original discoverers, Drs. Walter and Ida Noddack.

Metallic vanadium was obtained for the first time by J. W. Marden and M. N. Rich, of the Westinghouse Lamp Company.

A record-making deposit of borax, in the form of a new mineral called rasorite, was discovered in California by C. M. Rasor.

Prof. David I. Macht, of Johns Hopkins University, announced that polarized light speeded the growth of certain plants, and had other effects on life.

That the germs of tuberculosis contain a previously unknown compound, a phosphorus-containing fat, was discovered by Prof. R. J. Anderson, of Yale University.

Making of synthetic rubber from coal on a commercial scale was announced by the German chemical trust.

Electroplating of rubber from latex or colloidal solutions of rubber was developed upon an industrial scale.

Hydrogenation of coal to produce liquid fuels resembling petroleum reached the point of commercial application.

Progress in the further synthesis of chemicals from cheap raw materials was made.

Cornstalks were utilized experimentally as a source of cellulose for paper and artificial silk.

New denaturants for alcohol were developed, some of them being produced by synthesis from petroleum products.

The U. S. Bureau of Standards discovered that duralumin can be protected against corrosion by coating with pure aluminum.

## Engineering

The U. S. Army developed a new fire-control instrument for anti-aircraft artillery, which makes it possible for one man to aim any desired number of guns.

A new three-inch anti-aircraft gun firing fifteen-pound shells at the rate of about one every two seconds was developed by the U. S. Army.

The six-mile Moffat tunnel under James Peak, Colorado, was completed.

The Holland vehicular tunnel between New Jersey and New York City was opened to traffic.

The United States Steel Corporation inaugurated an extensive program of research into the fundamental problems of the industry.

A device for detecting one part of mercury in 20,000,000 parts of the atmosphere was developed by the General Electric Company.

Diphenyl oxide, a white chemical with a powerful odor like geraniums, was experimented with as a substitute for water in steam boilers, in an endeavor to increase their efficiency.

More durable paper currency resulting from tests of the U. S. Bureau of Standards resulted in estimated savings of one million dollars a year.

An acoustical plaster which absorbs most of the sound falling upon it was developed by the U. S. Bureau of Standards.

Methods of making low-cost roads of gravel, sand and clay were developed.

## Geology and Geography

Scientists of twenty-five nations, meeting at Prague, passed resolutions recommending an international co-operative study of "ocean deeps."

Floods in the lower Mississippi Valley and in New England were the worst that had ever been recorded.

That the Mississippi floods may be due to the gradual sinking of the lower valley of the river, closer and closer to sea-level, was suggested by Dr. David E. White, eminent geologist of the National Research Council and the U. S. Geological Survey.

Disastrous tornadoes struck Louisiana, Mississippi, Texas, Oklahoma, Illinois, Arkansas, Kansas and Missouri; St. Louis was particularly damaged.

Large quantities of oil may be deposited below the bottom of the sea, said Dr. Parker D. Trask, of the American Petroleum Institute.

Discoveries of potash salts in Texas and New Mexico thick and rich enough for mines were discovered through test borings made by the U. S. Geological Survey.

Seven thousand square miles in southeastern Alaska were surveyed by aerial mapping through the co-operation of the Navy and the U. S. Geological Survey.

Two large areas in Alaska totaling 7800 square miles were explored by scientists of the U. S. Geological Survey, discovering and mapping a high mountain region hitherto unknown and finding a volcano in eruption.

A great earthquake on May 22 in the Kansu province in interior China was announced to the world on the following day by Science Service, in co-operating with the U. S. Coast and Geodetic Survey and the Jesuit Seismological Association, though it was not for many weeks later that actual reports from the devastated region reached civilization.

Other severe earthquakes during the year that were immediately located by the co-operation of these three bodies included those in Chile, April 14 and November 14, Japan, March 27; Alaska, October 24 and California on November 4.

The heat of Kilauea, the world's largest volcano, was measured by means of borings made in its floor by Dr. T. A. Jaggar, director of the Hawaii Volcano Observatory.

## Medicine

The 1927 Nobel prize for medicine was awarded Prof. Julius Wagner-Jauregg, of Vienna, for his treatment of paresis by inoculation with malaria.

Cancer in the chicken can be rendered inactive by small quantities of aluminum and calcium salts, Mrs. Margaret R. Lewis and Dr. Howard B. Andervont discovered.

A "heart hormone," or internal secretion that stimulates the heart to keep it beating, was discovered by Dr. Ludwig Haberlandt, of the University of Innsbruck.

Thyroxin, the hormone of the thyroid gland, was made synthetically in the laboratories of University College, London, by Dr. C. R. Harington and Prof. George Barger.

Dr. J. J. Abel, of the Johns Hopkins University, has prepared a crystalline insulin which appears to be a pure hormone necessary for the maintenance of normal sugar metabolism.

"Synthalin," a German preparation designed to supplement or replace insulin in the treatment of diabetes, was at first widely hailed, but proved a disappointment.

Discovery of a new drug, "myrtillin," as a valuable treatment for diabetes, was announced to the American Medical Association by Dr. Frederick M. Allen, of Morristown, N. J.

Liver extract can be used to cure pernicious anemia, Drs. George R. Minot, William P. Murphy and E. J. Cohn, of Harvard University, announced; also the latter extracted from liver an extract which produces red corpuscles and probably is the active ingredient.

A diet that simulates a condition in the body brought about by starvation, has been found by Drs. F. B. Talbot, K. M. Metcalf and Margaret E. Moriarty at the Massachusetts General Hospital in Boston to give very successful results in treating epileptic children.

Vitamin C, the substance that wards off scurvy, is present in milk as well as in the fresh vegetables usually relied on to supply it, was the report by Prof. L. F. Meyer, following extensive experiments at the University of Berlin.

Ergosterol was declared to be the really active and essential substance in the antirachitic vitamin, by a number of investigators working independently of each other.

Dr. Alfred F. Hess, of New York, reported that dried milk that has been treated with ultra-violet light is the most practical of the irradiated foods that have been used to prevent rickets in babies.

Preventive vaccination for smallpox and typhoid, large quantities of quinine and elaborate mosquito control measures contributed to checking outbreaks of disease epidemics in the South after the Mississippi flood.

Drs. E. G. Wakefield and W. W. Hall, of the U. S. Navy Medical Corps, completed a systematic survey of heat injuries and one of the first investigations into the physiological reactions underlying sunstroke.

Scientists at Berlin have showed that it is possible to change simple embryonic tissues into malignant tissue by exposing the former in tissue cultures to the action of arsenic.

Discovery of the germ causing trachoma, a serious disease of the eye that has been especially troublesome among the Indians, was announced by Dr. Hideyo Noguchi, of the Rockefeller Institute, New York.

A curative antitoxin for erysipelas, first developed by Dr. K. E. Birkhaug, of Rochester, N. Y., has been tried out with highly successful results at the Bellevue Hospital in New York, which has one of the largest erysipelas clinics in the world.

Streptococcus germs isolated from skin lesions of erysipelas are capable of causing sore throat without any skin affection, it was found by Drs. George F. and Gladys H. Dick, at the John McCormick Institute for Infectious Diseases.

Progress in the work of developing a serum to fight the African sleeping sickness was announced by Dr. William H. Taliafero, of the University of Chicago.

A color test for tetanus and diphtheria toxins has been worked out by Drs. Lucy Mishulow and Charles Krumwiede, of the New York City Health Department, that will greatly speed up the commercial production of these products. Hitherto toxins have had to be tested out on live guinea pigs, a time-consuming and not altogether accurate procedure.

Dr. Florence B. Seibert, of the University of Chicago, has produced an active protein in crystalline form which represents a step nearer the solution of the actual chemical nature of tuberculin.

Statistical evidence that the first born child in a family is more likely to have certain malformations of mind and body than later children, and that such malformations are not likely to recur in later births in the same family, was presented by Dr. G. F. Still, professor of children's diseases at King's College, London.

The utility of X-ray photographs of the head as a positive means of identification was demonstrated by Drs. William L. Culbert and Frederick M. Law, of New York, when they identified an unknown body with their aid.

Heart disease occurs less frequently in children who have had their tonsils removed than in those who have not, said Dr. A. D. Kaiser, of Rochester, N. Y., before the American Medical Association.

An extract from the liver of dogs that will keep blood from clotting was discovered by Dr. W. H. Howell, of Johns Hopkins University.

A new anesthetic known as avertin, that lacks many of the undesirable features of the anesthetics now in use, is being tried out in German hospitals.

A new and accurate chemical test for drunkenness, by which the subject's breath is passed through a chemical solution, was demonstrated to the American Medical Association by Dr. Emile Bogen, of the University of Cincinnati.

The Metropolitan Life Insurance Company announced that their statistics showed that America has had more deaths from alcoholism since prohibition than before.

## Physics

A new theory of the mechanics of atoms was enunciated by the Swiss physicist, Schrodinger, which, in brief, holds that electrons and other units of matter are wave systems like ordinary light and X-rays.

The 1927 Nobel prize for physics was awarded jointly to Prof. Arthur H. Compton, of the University of Chicago, and Dr. C. T. R. Wilson, of Cambridge University, England, for their researches on X-rays and radium radiation.

The tercentennial of the death of Isaac Newton was celebrated by scientists all over the world.

Dr. Dayton C. Miller, of the Case School of Applied Science at Cleveland, Ohio, repeated experiments that may show that the earth is drifting through the ether.

Sound waves vibrating far too rapidly to be heard produced such curious effects as the emulsion of a candle in water, Prof. R. W. Wood, of Johns Hopkins University, said, in describing to the National Academy of Sciences work which he had performed in collaboration with Alfred L. Loomis.

Cathode rays from the tube recently invented by Dr. W. D. Coolidge, of the research laboratory of the General Electric Company, have been found to be like sunlight in their power to give certain substances the quality of preventing rickets.

An instrument known as the thermionic microammeter, able to measure one-five-billionth of an ammeter, was developed by the laboratory of the General Electric Company at Lynn, Mass.

The grid glow relay, invention of D. D. Knowles, Westinghouse engineer, which operates on a billionth of a watt of electrical power, was demonstrated.

Discovery of a new electrical insulator was announced by Dr. Abram Joffe, a Russian scientist visiting the United States.

A highly successful process of television, by wire and radio, the development of the Bell Laboratories under the direction of Dr. Herbert E. Ives, was demonstrated on April 7.

The televox, an apparatus by which the telephoned note of a tuning fork can be used to extinguish lights, start and stop electric fans, and operate other devices, was exhibited by its inventor, R. J. Wensley.

The non-magnetic ship "Carnegie" was overhauled preparatory to a lengthy scientific cruise to begin next year.

Metal shrinks when it is magnetized, Prof. S. R. Williams, of Amherst College, stated.

The conclusion that nebulium, the strange "element" supposed to exist in such bodies as the great cloud of glowing gas in the star group of Orion, is merely oxygen and nitrogen, was reached by Dr. I. S. Bowen, of the Norman Bridge Laboratory of Physics.

Dr. Paul R. Heyl, of the U. S. Bureau of Standards, announced the determination after three years' work of the Newtonian constant of gravitation as the fraction 6.664 over a hundred million; a value ten times more accurate than the previously accepted value.

The "quantum," the "atom" of which modern physicists suppose that light and other radiations consist, may be divided, was indicated by experiments by Dr. A. J. Dempster, of the University of Chicago.

The wind velocity of the hurricane that wrecked Miami on September 18, 1926, was determined as 132 miles an hour, which was declared the highest on record by Benjamin C. Kadel, of the Washington, D. C., Weather Bureau.

## Psychology

Statistics from Massachusetts, the first State to round up its entire new generation of feeble-minded in order to develop them into useful citizens, reveal the great number of such children now being wasted, Dr. Neil A. Dayton, of the Massachusetts Department of Mental Diseases, reported.

The experiment of caring for mental patients in a general hospital has been tried and found successful, and this method of care has many advantages, Dr. Thomas J. Heldt, of the Henry Ford Hospital in Detroit, reported.

Environment rather than heredity was shown to be the great cause of insanity according to a fifteen-year investigation of 28,000 individuals who died on Cape Cod in the past fifty years, reported by Dr. L. Vernon Briggs, psychiatrist.

American Psychiatric Association advocated adoption of laws to put the psychiatrist in court in the position of counseling the legal authorities as to the sanity and disposal of social offenders.

Tests to determine whether prospective school teachers will make good in the school room or not were devised and put to use by Prof. F. A. Moss and his assistants at the psychology department of George Washington University.

Dr. Knight Dunlap, professor of psychology at the Johns Hopkins Universiy, reported experiments that indicate the mouth is a more expressive feature of the face than the eyes.

Contrary to the usual notion that men of genius are physically frail, a study of several hundred great musicians of the past two centuries shows that they were an unusually healthy lot on the whole, Dr. James F. Rogers, of the U. S. Bureau of Education, reported.

A child gorilla's use of its hands was studied by Dr. R. M. Yerkes, of Yale University.

A study of why high school students fail in their course revealed that in a large percentage of cases teachers do not realize the basic causes of failure.

The effect of noise on a typist's efficiency, tested by Dr. Donald Laird at Colgate University, showed that the typist could keep up her accuracy only at the expense of speed and with a heavy drain on her energy.

Allowing children to give way to their impulses was denounced by Dr. Charles W. Burr, neurologist, who urged teaching children to control their emotions as a means of race improvement.

Adults up to the age of fifty learn better than children, experiments by Dr. E. L. Thorndike, professor of psychology at Columbia University, showed.

The nerve center which controls emotions was located as a very small section of the optic thalamus, in the old primitive part of the brain, as a result of experiments by Dr. Philip Bard at the physiological laboratory of the Harvard Medical School.

## Radio

The International Radiotelegraph Conference revised the world laws governing radio.

Reception of short-length radio signals was found to improve during periods of high sunspot activity.

The experience of the U. S. S. "Kittery" with a radio compass during hurricane weather indicated that the intensity of static may be of use in detecting and locating these disastrous storms at a distance.

Five-meter wave experiments by the General Electric Company showed that these short waves seem to cast shadows much like light.

Quartz plate was developed by the U. S. Bureau of Standards as a standard of radio frequency, bringing agreement between frequency standards of different nations to three parts of 100,000.

Station WGY at Schenectady operated on 100 kilowatt power, using the world's largest vacuum power tube of that power.

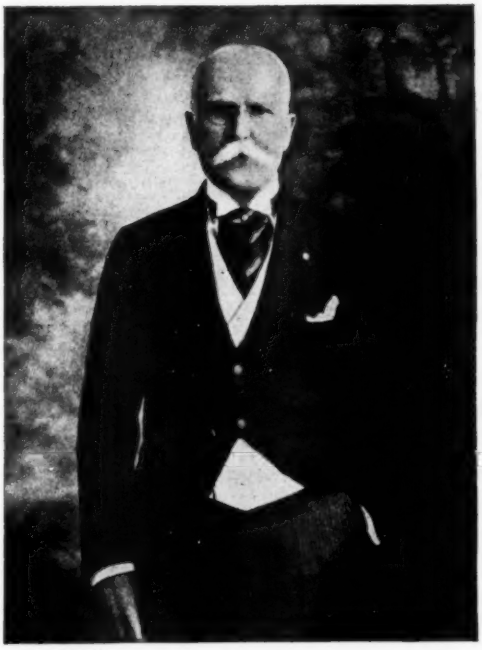
Broadcasting upon low wave lengths was begun, necessitating adapters to most ordinary receiving sets.

Electron tubes operating directly on house supply alternating current were developed.

# OBITUARY

## SAMUEL W. FAIRCHILD

Samuel William Fairchild, one of the foremost figures in American pharmacy, came of Pilgrim ancestry in a direct line from Thomas Fairchild, one of the company who founded the plantation of Stratford, Connecticut, about 1636, and was born at Stratford seventy-five years ago; he died on November 13, 1927. He was the son of Thomas B. Fairchild and Susan A. Fairchild.



SAMUEL W. FAIRCHILD

Mr. Fairchild studied pharmacy under that master pharmacist, Albert B. Taylor, of Philadelphia, and was graduated from the Philadelphia College of Pharmacy in 1873, the subject of his thesis being: "Legitimate Pharmacy." He then entered the drug store of Caswell, Hazard & Company, New York, and later was a salesman for McKesson & Robbins.

In 1878, Mr. Fairchild, with his brother, Benjamin T. Fairchild (a graduate also of the Philadelphia College of Pharmacy, class of 1872), organized Fairchild Brothers for the manufacture of digestive enzymes. In 1881 Macomb G. Foster was taken into partnership, and the firm's name was changed to Fairchild Brothers & Foster.

Mr. Fairchild has ever evinced a keen interest in pharmacy, especially in pharmaceutical education. From 1890 to 1896 he was president of the New York College of Pharmacy; in 1908 he received the honorary degree of master in pharmacy from the Philadelphia College of Pharmacy, and in 1911 he had conferred upon him the degree of master of science by the Columbia University. He was for many years an active member of the American Pharmaceutical Association, the New York Pharmaceutical Association, and the Drug and Chemical Section of the New York Board of Trade and Transportation.

He founded the Fairchild Scholarship for students of pharmacy in Great Britain and Ireland in 1904 in recognition of the fine relationship which had long existed between his firm and British pharmacy, and in 1915 he established the Fairchild Scholarship for American students of pharmacy.

Mr. Fairchild took an active part in busness, civic and social life. He was a member of the Union League Club of New York (president in 1911-15), and the New York State Chamber of Commerce, a veteran of the Seventh Regiment of the National Guards of the State of New York, and a member of the Sons of the Revolution, the Pilgrims, the New England Society of New York, the Metropolitan Club (New York and Washington), the Metropolitan Museum of Art, and of various benevolent societies; he was also actively identified with many banks and financial institutions. He was a trustee of the Polyclinic Medical School and Hospital and vice-president of the Sevilla Home for Children. He was one of the incorporators of the Bronx Botanical Gardens, director of the French American Society, vice-president of the French Institute in the United States, and a member of the Virginia Club of Norfolk, Devonshire Club of London, Travelers Club, and L'Union Interalliee of Paris.

For distinguished services during the World War, France made Mr. Fairchild a chevalier of the Legion of Honor, Belgium bestowed upon him the Cross of Officer of Leopold Second, and Greece decorated him with the Golden Cross of the Royal Battalion of George First.

He married Miss Emily Justine Tappen in 1877, who, with three daughters, Mrs. William R. Kirkland, Mrs. Henry W. Butler, and Mrs. Byron A. Long, and two sons, Benjamin T. and Samuel W. Fairchild, survive.

The funeral was held in St. Thomas' Church, New York, November 16, and was attended by many leading citizens of the city.

Samuel W. Fairchild was a man of unusual ability and personality. A distinguished, courteous and polished "citizen of the world," he was blessed with fine native intelligence, sagacity, intuition and ideals motivated to an uncommon degree with the gift of common sense. His host of friends and admirers will mourn his passing.

J. W. ENGLAND.

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# SCIENTIFIC AND TECHNICAL ABSTRACTS

EPHEDRINE VS. ADRENALIN—The Chinese drug, ephedrine, that seemed for a time to rival the effects of adrenalin, the extract of the suprarenal glands famed for its so-called power to bring the dead to life, is not so potent as was at first believed, according to a report just made to the American Pharmaceutical Association.

Ephedrine was isolated from a Chinese plant in 1887 but first received serious consideration in recent medicine through the researches of Dr. K. K. Chen at the University of Wisconsin. There seems to be little doubt that the drug possesses considerable merit in raising blood pressure but recent investigations undertaken by Dr. L. W. Rowe, of Detroit, indicates that there is little evidence that it will supplant adrenalin as the first clinical reports led many physicians to believe. The reasons for the high hopes of the earlier investigators lay in the facts that ephedrine could be given by mouth instead of by injection and had a more prolonged action on the heart than adrenalin.

Dr. Rowe's work has shown that the new drug has a more lasting action when given hypodermically in large doses but that its value when given by mouth has been somewhat exaggerated. In general, he believes that its qualitative action is similar to that of adren-

alin in several respects but that it is much less powerful.—(*Science Service.*)

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Composition of Tobacco Smoke.—The smoke emitted from any smoldering vegetable matter, including tobacco, contains ammonia gas and pyridine or pyridine derivatives, and it is these substances which produce the irritation of mucous surfaces not infrequently observed in those who smoke; these bodies are responsible for the morning cough, the irritation of the throat and tongue, and the conjunctivitis of the cigarette smoker. They are in every respect objectionable products and add nothing to the pleasure of smoking. If they could be excluded from the smoke it would be all to the benefit of the smoker. Other dried herbs—such, for example, as coltsfoot leaves, at one time sold as a boys' tobacco which was harmless—often produce more pyridine when allowed to smolder than tobacco, but they have none of its calming effects. The pyridine bases are oily volatile liquids, intensely irritant, but, compared with nicotine, of a relatively low toxicity.—Dixon, W. E.: The Tobacco Habit, Norman Kerr Lecture, *Brit. M. J.*, Oct. 22, 1927 (through *Jour. A. M. A.*).

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Plant Life Processes Imitated in Laboratory.—An approximation of the process whereby living plants produce sugar from water and carbon dioxid, using the energy of light to make the combination, has been accomplished in the laboratory of Prof. E. C. C. Baly, of Liverpool University. Using the most elaborate precautions against contamination of either his materials or the glass vessels used in the experiments, the British scientist and his associates have repeatedly produced substances that pass all the chemical tests for sugars.

The first tests were made with the invisible ultra-violet light as the source of energy. In these experiments, finely powdered iron and aluminum compounds were introduced into the water. These took no part in the reaction, but acted as catalysts, or chemical go-betweens, furnishing a large spread of surface on which the chemical action could take place.

But in nature the formation of food substances by plants is carried on by the power of visible rather than invisible light. The

experimenters therefore sought a closer artificial approach to natural conditions. Since leaves have colored substances in them, colored catalysts were sought for the sugar-formation going on in the glass tubes. For this purpose carbonates of cobalt and nickel, both of which are colored salts, were found useful. With these in the tubes exposed to visible light from electric lamps, the carbon dioxid and water produced the sugars quite as readily as they came into being with colorless catalysts under ultraviolet light.

To the objection advanced by some critics, that the sugars would be formed by combination of the gas and water in the dark, Prof. Daly answers that he tried this over two hundred times, and that the results were always negative.—(*Science Service.*)

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Moth-Proofing Solutions.—Clothes moths really do have a hard time chewing up woolen cloth and other fabrics of animal origin that have been impregnated with one of the various mothproofing solutions now in wide use, according to Dr. E. A. Back, of the Bureau of Entomology of the U. S. Department of Agriculture. It is misleading, however, to offer an absolute guarantee of protection, he states, and the common method of merely spraying the fabrics confers but little protection. The only way to do the job thoroughly is to wet the cloth through while it is still in the whole piece, and many manufacturers have installed special machinery for this purpose.

One of the favorite and most widely advertised moth-repellants consists of 97 per cent. of water with 3 per cent. of sodium aluminum silicon fluoride dissolved in it. Though this solution sells at a very high price under its copyrighted trade name, it really does work, if thoroughly applied. Another newly marketed class of compounds is made up of the cinchona alkaloids, chemically allied to quinine.

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Progress in Cancer Research—Another advance has been made toward the solution of the cancer problem.

Dr. Margaret R. Lewis, of the Department of Embryology of the Carnegie Institution of Washington, and Dr. Howard B. Andervont, of the Johns Hopkins University, have just succeeded in establishing that the unidentified organism that causes the Rous chicken

sarcoma can be rendered inactive by means of small quantities of aluminium and calcium salts.

The significance of this work lies in its possible application in the treatment of human cancer. An immense amount of research will have to be done before any such result is likely to ensue but these recently learned facts point the way to a new direction for cancer research in other laboratories. The chemicals that have been used in the treatment of cancer in the past have been highly toxic in character with a strong tendency to injure other parts of the body as well as the cancer cells. If it is found that calcium and aluminium compounds, either given by mouth or injected into the blood stream, will have an adverse effect on cancer in chickens, it may lead to results of great benefit in treating human cancer because these compounds are more or less inert with little capacity to harm body tissues.

"While the primary tumor of this particular type of malignant chicken cancer," explained Mrs. Lewis, "differs in some respects from those found in human beings and higher animals, the secondary tumors or metastases, as they are called, are similar to the malignant sarcoma of man. The chicken tumor behaves quite as those of other kinds of animals in that it invades the tissues, develops metastases, leads to the death of the animal and can be transferred by means of transplantation from one animal to another of the same species, though not, of course, to an animal of a different species.

"The chicken tumor also resembles certain other diseases in that it is caused by a still unidentified agent that behaves like the so-called filterable viruses responsible for smallpox, rabies and encephalitis in rabbits. Many years ago Dr. Peyton Rous and Dr. J. B. Murphy, of the Rockefeller Institute for Medical Research, found that the causative agent of chicken tumor remained active in a filtrate, a glycerine extract or in the dried material of the tumor itself. It was also established by these workers that inoculation of these agents not only produced the disease but if the animal recovered from the tumor it was more or less immune to further inoculation of the tumor virus."—(*Science Service.*)

# CORRESPONDENCE

UNITED STATES CIVIL SERVICE COMMISSION
Washington, D. C.

The Editor:

The Commission believes that the following announcement would interest many of your readers who may wish to take an examination for the Federal civil service. Any publicity you may give this item of news will be appreciated.

U. S. CIVIL SERVICE COMMISSION.

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UNITED STATES CIVIL SERVICE EXAMINATIONS.

The United States Civil Service Commission announces the following open competitive examinations:

JUNIOR PHARMACOGNOSIST
JUNIOR PHARMACOLOGIST

Applications for these positions must be on file with the Civil Service Commission at Washington, D. C., not later than December 30. The date for assembling of competitors will be stated on their admission cards, and will be about ten days after the close of receipt of applications.

The examinations are to fill vacancies in the Department of Agriculture, and the Public Health Service, for duty in Washington, D. C., or in the field.

The entrance salary in the District of Columbia is $1860 a year. A probationary period of six months is required; advancement after that depends upon individual efficiency, increased usefulness, and the occurrence of vacancies in higher positions. For appointment to the field service the entrance salary will be approximately the same.

The duties of junior pharmacognosist are to examine under the direction of an associate pharmacognosist all crude drugs and spices coming within the jurisdiction of the Federal food and drugs act, and to determine whether or not they are adulterated or misbranded.

The duties of junior pharmacologist are to assist in the study of pharmacological action of drugs and to act as a research assistant to the pharmacologist; to conduct bioassays upon U. S. P. drugs and

glandular products; and to assist in the development of bioassay methods for various drugs.

Full information may be obtained from the United States Civil Service Commission, Washington, D. C., or the secretary of the United States civil service board of examiners at the postoffice or customhouse in any city.

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### ERRATUM

Editor Ivor Griffith,
American Journal of Pharmacy,
145 N. 10th St.,
Philadelphia, Pennsylvania.

Dear Editor Griffith:

I note that in the legend under the reproduction of the photograph of those in attendance at the Plant Science Seminar that an error in the name of the person at the right hand of Dr. C. C. Plitt has occurred. This is not Mrs. Dr. Plitt but Miss B. Olive Cole.

Would it be possible for you to indicate the correction in the next number of the Journal?

Very truly yours,

E. N. GATHERCOAL.

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## NEWS ITEMS AND PERSONAL NOTES

JULIUS KOEHLER, DECEASED.—The death of Julius Koehler, which occurred suddenly Wednesday morning, November 9th, at his home, 1274 Bergen Street, Brooklyn, N. Y., came as a distinct shock to the entire Essential Oil Trade with which he has been identified for many years. Few men have been so widely known in the industry as Mr. Koehler, who has been connected with the firm of Fritzsche Brothers, Inc., since August 26, 1887. In May, 1919, he was made secretary, in which capacity he served until June 30, 1925, retiring on that date from active participation in the affairs of the firm in order that he might devote more attention to his private interests.

His engaging personality, genial manner and sterling character won for him a host of friends throughout the entire country and the

regard in which he was universally held is well exemplified in the statement of one of the leaders in the Essential Oil trade that Julius Koehler was one of nature's finest gentlemen.

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A CHINESE FORMULARY—There has recently come to us a copy of the latest edition of the Peking Union Medical College Formulary (3d edition), October, 1927. This was sent to us with the compliments of the Department of Pharmacy of the College through Mr. John Cameron.

This edition has decreased the size of the page so that the book is suitable for the pocket. A new antidote list is added, which includes most, if not all, of the poisons commonly met with in China, and a new therapeutic index based on Cushny's work which should be useful for the younger set of Chinese medical graduates. There has been added doses (minimum and maximum) of most of the drugs listed in the Formulary.

The little publication was printed on the college press by Chinese printers, none of whom speak or write English. It is a splendid tribute to the ability and industry of Mr. Cameron, an English pharmacist, who has spent most of his professional career in that part of the Orient.

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PHILADELPHIA COLLEGE OF PHARMACY AND SCIENCE.—As a result of the students' class elections recently held at the Philadelphia College of Pharmacy and Science, the following student officers were elected:

*Senior Class.*

P. W. Unangst, president, Easton, Pa.; Norman Frank, vice-president; A. R. Burr, treasurer, Brewer, Me.; Florinel Whalen, secretary, Mahanoy City, Pa.; Executive Committee: M. T. Fisher, J. A. Bullock, Louis Jaffe, Arthur H. Cox.

*Junior Class.*

P. B. Lecrone, president, Philadelphia; Harry Steinhouse, vice-president, Philadelphia; I. H. Bernett, treasurer, Philadelphia; Marianna Clark, secretary, Uniontown, Pa.; Executive Committee: Miss Marie Dreier, chairman, R. R. Epstein, F. B. Palmer, P. J. Coxe, P. F. Caffrey.

The Bachelor of Science class held an election for the Freshman Class officers as follows:

Manuel Tubis, president, Philadelphia; Theodore Michel, vice-president, St. Joseph, Mo.; Albert Franklin Deuble, secretary, Philadelphia; Carroll W. Cole, treasurer, Kirklyn, Pa.

*Student Council.*

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| Paul Little, '28 Ph. G. | Garret Miller, '28 |
| Edward Green, '28 Ph. G. | Joseph Davis, '29 |
| Mariana Clark, '29 Ph. G. | Sterling Altemus, '29 |
| Timothy Watt, '28 Ph. G. | Ernest Ade, '29 |
| Joseph Gardner, '28 Ph. G. | Alfred Burr, '28 |
| C. W. Moyer, '28 | R. R. Evans, '28 |
| David Houser, '29 | Mrs. M. Kornblith, '28 |
| Norman Frank, '28 | L. Jaffe, '28 |
| Harry Steinhouse, '29 | John Beatty, '28 B. Sc. |
| Joseph Chankin, '28 | E. Hanford, '30 B. Sc. |
| Lewis Miller, '28 | Arthur Osol, '28 B. Sc. |

Paul Wieseman, '29 B. Sc.

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The basketball season at the Philadelphia College of Pharmacy and Science has been launched, and victory fell to the Blue and White in the first game of the season. The Varsity squad, picked from the great number of candidates, showed a great amount of skill and promised to do justice to the rather heavy schedule that has been arranged.

Mr. L. G. Cordier, an instructor at the institution, who is coaching the team, has been developing sterling teamwork, and is training the players' eyes for the basket. Gene Catteau, of last year's winning team, has been elected captain, and is playing a hard game.

One of the biggest handicaps to be overcome is the lack of a home floor for practices. This is being remedied, however, in the acquisition of a gym in the new building, opening about February 1st.

The Philadelphia Association of Retail Druggists this year established a cup to be awarded at the end of the season to the most valuable player on the squad. This is causing much interest and is making the players hustle. Players and student rooters are all very enthusiastic, the games drawing great crowds, and attracting much outside interest.

# BOOK REVIEWS

THE WAR ON MODERN SCIENCE—A Short History of the Fundamentalist's Attack on Modernism. By Maynard Shipley, President, Science League of America. Published by Alfred Knopf, New York. 415 pages, price $3.00.

This volume is a short history of the recent attacks on evolution and modernism, written by Maynard Shipley, president of the Science League of America. It is a history of an organized effort on the part of certain powerful and influential organizations to prevent by law the teaching of modern science and modern theories as to the origin and development of man, and the author foresees, and justifiably so, the inevitable conflict of war on science as a whole, and warns us of the far-reaching results to be expected if the forces of traditionalism and obscurantism are permitted to carry out their program. It is a disturbing book, and has aroused the apprehension of many thoughtful readers. The author asserts that more than twenty-five millions of men and women in the United States, with ballot in hand, have declared war on modern science. Ostensibly a "war on the teaching of evolution in our tax-supported schools," the real issue is much broader and deeper, much more comprehensive in scope. "Today," as Van Loon expresses it, "the house of science is a fortress besieged."

One must read the story of the battle being fought in nearly every State in the Union to fully appreciate the menace which is at our very doors today. "The Shame of Tennessee" is bringing the blush to cheeks of the so-called "irresponsible oligarchy of self-styled intellectuals" in many other States.

It would be amusing were it not tragic to read that in the town of Goshen, Indiana, a gladiolus grower was cast out of church because the authorities decided that in hybridizing his gladioli to produce new varieties he was "interfering with the divine scheme of things." Is it a wonder that Shipley refers to our country as these "Benighted States," when similar absurd conditions exist in nearly every State of the Union!

Every preacher, teacher, physician, pharmacist, and thoughtful man and woman should read this book—it is startling, alarming, thought provocative. We must not be ignorant of this almost uni-

versal menace. As John Emerson Roberts finally expresses it, "Science has been resisted in every age. Slowly and painfully she has advanced, but never turned back. Great today are her achievements, staggering credulity; and yet she is threatened as never before."

Many in this army fighting science and scientific teaching are morally good but woefully ignorant; well-meaning and sincere, but intolerant and misguided, and remind one of Erskine's statement "that the good man's first duty is to be intelligent; it is not enough to be good and stupid." They must be taught that our hopes for the future of mankind are bound up with the steadfast growth of scientific knowledge.

Scientific men are apt to forget their obligations to the general intelligence of mankind. Scientific inquiry takes its workers into remote and lonely places, where they lose the faculty and facility of ordinary speech. The popular lecturers in scientific subjects, avoiding scholastic and technical terms as much as possible and stating the truth simply as it presents itself, play an important part in educating the average man in regard to the work of the scientific investigator and laboratory hermit.

According to recent statistics gathered by Huntingdon and Whitney in their book on "The Builders of America," there are only 12,000,000 people in America above average intelligence, and only 4,000,000 of these are rated "very superior," and they must educate the remainder of our population, and this group must patiently disseminate what Osler has well termed the "leaven of science." Truth has well been called the "daughter of time."

The teaching of biology must not be hampered, for it touches the problems of life at every point and may claim, as no other science, completeness of view and comprehensiveness which pertains to it alone. Over a third of a century has elapsed since Andrew White, the first president of Cornell University, in a lecture in Cooper Institute, maintained this thesis: "In all modern history interference with science in the supposed interest of religion, no matter how conscientious such interference may have been, has resulted in the direst evils both to religion and science, and invariably; and, on the other hand, all untrammelled scientific investigation, no matter how dangerous to religion some of its stages may have seemed for a time to be, has invariably resulted in the highest good both of religion and of science."

WILMER KRUSEN.

JAHRESBERICHT DER PHARMAZIE, herausgegeben vom Deutschen Apotheker Verein. Bearbeitet von Geh. Rat Dr. H. Beckurts, Professor an der Techn. Hochschule in Braunschweig und Dr. C. A. Rojahn, Professor an der Universitat in Freiburg i. B., unter Mitwirkung von Dipl.—Ing. S. M. v. Bruchhausen in Cassel. 60 Jahrgang, Bericht über 1925. Octavo, 544 pp. Mk. 20—Vandenhoek und Ruprecht, Göttingen 1927.

The "Vaterland" is the mother of the Year Books, including the one on pharmacy which was first published in 1841 under the title "Jahresbericht über die Fortschritte der Pharmazie und Pharmakognosie." The editors were two well-known pharmacists and teachers, Apotheker Dierbach of Heidelberg and Martius of Erlangen. In 1866 the shorter and more suitable title "Jahresbericht der Pharmazie" was adopted. Since 1884 this work has been compiled by an authority and research worker in the field of pharmacy, namely Dr. Heinrich Beckurts, Professor emeritus at the Technical High School in Braunschweig. Beginning his career as a practical pharmacist, he became actively engaged in literary work, which, in spite of his seventy-two years, he continues to pursue as can be seen from the book before us. The referee during his European trip made a special trip to the world-renowned Technical High School in Braunschweig but missed Professor Beckurts, who was away on his vacation.

The abstracts of the German Year Book are classified as follows:

I. Pharmacognosy—Vegetable and Animal.

II. Pharmaceutical Chemistry—General, Inorganic and Organic.

III. Galenicals arranged in groups and New Remedies, Nostrums and Specialties.

IV. Medical Chemistry.

V. Food Chemistry.

VI. Toxicology.

This is followed by a list of books published during 1925, an Author's Index and a Subject Index. The Jahresbericht der Pharmazie is an indispensable reference work in the library of the pharmacist!

OTTO RAUBENHEIMER, Ph. M.

GENERAL INORGANIC CHEMISTRY. By M. Cannon Sneed, Professor of Chemistry and Chief of the Division of General Inorganic Chemistry, School of Chemistry, University of Minnesota. Octavo, 674 pages. Cloth, $3. Ginn & Co., 15 Ashburton Place, Boston, Mass.

In the selection of material for this book before us the author constantly kept two main objects in mind. The first of these is to offer the fundamental information necessary to prepare students for the further study of chemistry and related sciences; the second, to make the treatment broad enough to meet the needs of the large number of students whose major interests lie in other fields. To accomplish these purposes an attempt has been made to reach a proper balance between descriptive and theoretical matter. In this the author has well succeeded!

Most of the 132 illustrations show complete set-ups of apparatus, that students may see more clearly the purposes of the experiments described. Historical matter has been freely introduced to show that chemistry is an experimental science and is not free from the mistakes to which human beings are subject. Another advantage of the book are the full page portraits of celebrated chemists together with short descriptions, as for instance: Lavoisier, Priestley, Dalton, Berzelius, Gay-Lussac, Avogadro, Cannizzaro, Davy, Faraday, Mendeléef and Mme. Curie. Let us hope that the next edition of the book will also include a portrait of Karl Wilhelm Scheele, the apothecary, to whom chemistry should be forever thankful for his researches.

The Index of the book comprises sixteen double column pages and is a true proof of its contents. Sneed's "Chemistry" is a book that the referee can highly recommend.

OTTO RAUBENHEIMER, Ph. M.

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LABORATORY MANUAL OF GENERAL INORGANIC CHEMISTRY. By M. Cannon Sneed and Raymond E. Kirk. Octavo, 181 pp. Cloth, $1.20. Ginn & Co., 15 Ashburton Place, Boston, Mass.

The manual before us follows the order of chapters of Sneed's "General Inorganic Chemistry," reviewed above. Some experiments are included that can normally be performed by any single class of students. The sixty-one illustrations help to elucidate the text. Instead of adhering to the customary practice of directing students to

take "a little of this" and "some of that" reagent, the authors, in keeping with the tenets of an experimental science, have given specific directions wherever possible. It is, however, to be regretted that the authors use the term "milliliter," abbreviated ml., in place of cubic centimeter. As the referee has expressed himself on many previous occasions, now that we are somewhat familiar with the term cc. it has to be thrown overboard!

OTTO RAUBENHEIMER, Ph. M.

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THE STORY OF CHEMISTRY. By Floyd L. Darrow, author of "Through Science to God." Octavo, 528 pp. Illustrated. Cloth, $4. The Bobbs-Merrill Co., 18 E. Vermont St., Indianapolis, Ind.

The author begins this book with the alchemist and through centuries up to the present day, the age of research. The referee is somewhat disappointed that the author did not begin his "Story" with a still earlier period! Above all, it is to be regretted that Pharmacy, "the mother of chemistry," according to such an authority as Prof. Paul Walden, is not even mentioned in the book!

The "Story" is almost entirely free from chemical formulas, equations and mathematical problems, so forbidding to the non-technical reader. It makes easy reading of what is ordinarily regarded as difficult matter. The book is written in simple understandable English. It entertains as well as instructs!

OTTO RAUBENHEIMER, Ph. M.

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OLD SOX ON TRUMPETING. By E. T. Gundlach. 12 mo., 362 pp. Illustrated. Cloth, $2. Consolidated Book Publishers, Inc., 2242 Grove St., Chicago, Ill.

America is spending for advertising during the current year an estimated sum of one billion, two hundred and fifty million dollars—nearly all spent on plans made by advertising experts. How much of this expert planning is based on *science,* on *superstitition,* on pure *"bunk"?* The author puts this mixture into a mill and milled it, he separates the wheat from the chaff, he gets at the kernels of truth and pursues them. This is done in the form of a burlesque which deals with the advertising or trumpeting adventures of Zeus, the merchant prince in ancient Greece and the unmasking of "trumpet-

ing hokum" by that enemy of loose thinking—Socrates, the "Old Sox" of this tale. The author gives numerous concrete suggestions as to ways to simple, sound sense, "brass tack" ways of making money through advertising, by knowledge and not mere guesswork.

The comedy is delightful reading and pharmacists and pharmaceutical manufacturers can well profit by it.

OTTO RAUBENHEIMER, Ph. M.

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25 JAHRE PHARMAZEUTISCHES INSTITUT DER UNIVERSITAT BERLIN. Eine Uebersicht über die seit dem Bestehen des Institutes in ihm geleistete wissenschafliche Arbeit. Herausgegeben von Prof. Dr. H. Thoms, Geh. Regierungsrat. Lex. 536 pp. Mk. 27. Urban & Schwarzenberg N. Friedrichstr, 105 B., Berlin, N. 24.

The celebrated Pharmaceutical Institute of the University at Berlin-Dahlem was opened on October 27, 1902, and under the directorship of Prof. Dr. Thoms became so famous that students came from all over the world. This year marks the silver anniversary of the institution, which is in a flourishing condition. The book before us is Vol. 13 of the researches done at the Institute. These are subdivided as follows:

Part I. General Survey.

Part II. Researches since 1921. A. Phytochemistry; B. Cultivation of Medicinal Plants; C. Organic Chemistry; D. Catalysis; E. Inorganic and Physical Chemistry; F. Analytical Chemistry and G. Laboratory and Apparatus.

This book is a markstone in pharmaceutical research and should be in the hands of all pharmaceutical chemists and like its predecessors should be part of the library of our colleges of pharmacy.

OTTO RAUBENHEIMER, Ph. M.

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THE "WELLCOME" PHOTOGRAPHIC EXPOSURE CALCULATOR, HANDBOOK AND DIARY, 1928.

The annual appearance of this extremely interesting and useful little handbook is awaited with great anticipation by many who rely upon it year after year.

No effort has been spared by the compilers to make the 1928 issue up to date, popular and helpful. A brief review of its contents will reflect the scope and character of the book.

The frontispiece shows a splendid reproduction of an Alsatian wolfhound produced by two-color toning. The toning method is explained in detail and is novel and interesting. Facing the title page is an official photograph of the Duke and Duchess of York's royal tour to New Zealand and Australia.

The literary contents are written as simply and directly as possible and include articles on development by all methods, desensitizing, intensifying, reducing, printing, toning, etc. In the exposure section all the plates and films, bromide and gaslight papers have been carefully tested and the speeds revised. The list has been made complete by the addition of all the new material brought upon the market up to the time of publication. An article on exposure in cinematography will be appreciated by the ever-growing number of motion picture workers.

The book is clearly and progressively arranged so as to provide a complete guide to picture making from the calculation of the correct exposure to finishing the print and includes a host of practical tables, suggestions and tips and is equally indispensable for the beginner and the expert.

Four editions are issued respectively for Northern Hemisphere and Tropics, Southern Hemisphere and Tropics, Australia and Tropics, United States of America.

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The firm of Dr. Willmar Schwabe, Leipzig, O. 29, the largest retail and wholesale homeopathic pharmacy in the world, submitted the following three publications for review:

60 Jahre im Dienste der Homoeopathie, 1866-1926.

All innovations are opposed. As a rule, contemporaries do not readily accept new ideas, due also to jealousy or ignorance. History is full of examples of this sort. Galvani was laughed at and called the "Frog's Dancing Master." Auenbrugger was made fun of for drumming on patients. W. Harvey, discoverer of the circulation of the blood, lost over half of his consulting practice. Constantinus Africanus had to leave Carthage. The first dentist in New York who filled teeth with amalgam had to flee for his life, because of a cry set up that he was poisoning patients with mercury. And Samuel Christian Friedrich Hahnemann (1755-1843), "The Father of Homeopathy," had a similar fate.

The "Festschrift" before us was dedicated to the adherents of homeopathy on the opening day of the new manufacturing plant and laboratory of the firm. It not only contains the history of the firm but also the history of homeopathy. The paper, the printing, the illustrations and the binding are of such high class as to make the book a work of art!

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KLEINES MEDIZINISCHES TASCHEN-WOERTERBUCH. 10 Auflage. 213 pages.

A very handy pocket size dictionary, giving the German translation of not only the principal but also odd medical terms. It is a "multum in parvo" and for that reason can be highly recommended.

OTTO RAUBENHEIMER, Ph. M.

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MATHEMATICS FOR THE PRACTICAL MAN. By George Howe, M. E. Illustrated. Sixteenth thousand. 153 pages. D. Van Nostrand Co., 8 Warren Street, New York City.

This book "begins at the beginning and assumes no mathematical knowledge beyond arithmetic. The author has endeavored to gather together in a concise and simple but accurate and scientific form the fundamental notions of mathematics. He gives no elaborate demonstrations and takes as his motto: 'Where there is much chaff, the seed is easily lost.'" In nine chapters he presents the fundamentals of algebra and then continues with a chapter each of geometry, trigonometry, logarithms, co-ordinate geometry and calculus. This little concise book is to be highly recommended.

OTTO RAUBENHEIMER, Ph. M.

# INDEX TO VOLUME 99 OF THE AMERICAN JOURNAL OF PHARMACY

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## SUBJECTS

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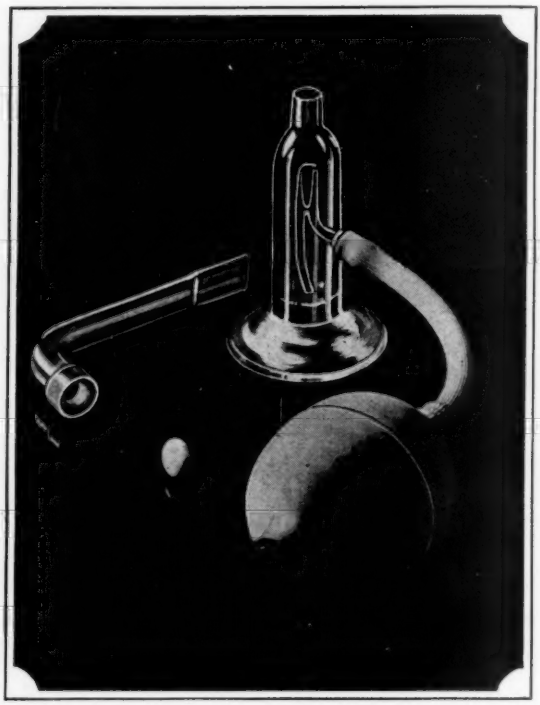

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